THE INFLUENCE OF THE ROYAL SOCIETY ON THE PROSE STYLE OF JOSEPH GLANVILL

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PREFACE

In this study I attempted to assess the impact of the Royal Society of London (founded in 1662) on the writing style of Joseph Glanvill, a Protestant clergyman who became a member and ardent defender of the Society. I applied nine readability formulas to selected passages from three editions of Glanvill's work: The Vanity of Dogmatizing (1661), Scepsis Scientifica (1665), and "Against Confidence in Philosophy" (in Essays on Several Important Subjects in Philosophy and Religion, 1676).

The passages I tested indicate that Glanvill was consciously trying to fit the Royal Society ideals of simplicity and brevity. Though he made few significant changes in Scepsis, in Essays he not only substituted simple words for complex ones but he also eliminated verbosities and superfluities, enabling him to reduce the 250-page Vanity to a 33-page essay. Yet his average sentence length steadily increased, for which the readability formulas penalize him heavily. I found it a problem that the formulas are unable to measure Glanvill's sentence length relative to his own age, and I believe the grade levels they assign are far less significant than the general trend in Glanvill's writing toward simplicity and brevity--a trend encouraged by his membership in the Royal Society.

My special thanks go to all who have helped me with this project. In the beginning, Dr. Merrill Whitburn, then my colleague at Texas A&M University, suggested this topic to me. Dr. Thomas Warren, my adviser

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CHAPTER I

INTRODUCTION

Subject and Purpose

In 1662 a group of pioneering reformers founded the Royal Society of London, the first organized scientific body in England. They insisted that papers presented to the Society or published in its journal be written in plain prose, the language of common men. The stylistic platform of the Royal Society was instrumental in changing the style of scientific and technical prose. Perhaps the most outstanding example of the Society's immediate and profound influence on scientific and technical prose is to be found in the writings of Joseph Glanvill, a Protestant clergyman who became an ardent defender of the Society. Though I do not wish to deny the importance of other factors influencing Glanvill, The Royal Society's influence on Glanvill's prose style is the subject of this paper, and the purpose is to assess both the initial impact and the lasting influence of the Royal Society on Glanvill's prose.

Scope

To reveal trends in Glanvill's successive writings, I used a microcomputer to apply nine well-known readability formulas to sequential editions of Glanvill's work: The Vanity of Dogmatizing (1661), Scepsis Scientifica (1665), and "Against Confidence in

Philosophy" (in Essays on Several Important Subjects in Philosophy and Religion, 1676). I chose passages near the beginning, middle, and end of The Vanity of Dogmatizing that have corresponding passages in Scepsis Scientifica and Essays, and I applied the nine readability formulas to these nine passages (the three from Vanity and the corresponding passages in the other two works). The formulas are the Dale-Chall, Fry, Flesch, Flesch-Kincaid, Gunning Fog, Devereaux/ARI, Coleman, Powers, and Holmquist.

Plan of Development

In the following chapter I will define prose style in general and scientific and technical prose style in particular in an attempt to set the stage for a discussion of the rise of the plain style in scientific and technical writing. I will introduce the Royal Society of London as a prime initiator of the change to a plain style, and following a review of the literature concerning the influence of the Royal Society I will introduce Joseph Glanvill as a case study of the Society's influence. In Chapter III I will discuss the ways in which Glanvill's style changed as he published the sequential editions of The Vanity of Dogmatizing and review the critical commentaries that have been based on these changes.

In Chapter IV I will explain the concept and history of readability. Then, based upon the survey presented in Chapter IV, in Chapter V I will discuss the application of the nine recognized readability formulas to the selected representative passages from The Vanity of Dogmatizing, Scepsis Scientifica, and Essays on Several Important Subjects in Philosophy and Religion. I will assess the value

and extent of Glanvill's stylistic revisions as he tried to conform with the dictates of the Royal Society.

I will summarize the results of my study in Chapter VI, combining the individual scores for each work into a composite score for that work. I will then compare these composite scores in order to trace changes in Glanvill's writing from 1662 to 1676.

Finally, in Chapter VII I will evaluate the readability studies and then draw conclusions regarding the lasting influence of the Royal Society.

CHAPTER II

BACKGROUND

Prose Style: A Definition

Style is the manner in which something is said or done, as opposed to the matter itself. One modern writing handbook says writing style is the way "language functions in particular situations" (8, p. 573), but Richard Foster Jones (45, p. 977) finds it more elusive, calling it "the most complex phenomenon in literature." Indeed, writing style is difficult to pin down because it can be as varied and as individual as a person's signature. In his textbook Technical Writing: Purpose, Process, and Form, Thomas L. Warren (76, p. 13) calls style "decision making," and that description is reflected in Herman Weisman's (78, p. 27) definition in his textbook Basic Technical Writing: "Style is the way a person puts words together into sentences, arranges sentences into paragraphs, and groups paragraphs to make a piece of writing express his thoughts clearly." As this definition indicates, writing style is a combination of distinctive features--primarily diction (word choice), syntax (sentence structure), and organization. Though a host of factors may play a part, most people would agree that the chief determiners of a prose writer's style are the level and type of words he uses and the length and pattern of his sentences.

Scientific and Technical Prose Style

Scientific and technical writing call for a special style, or some might say a lack of style. In a broad sense, technical writing is the objective presentation of any factual information. That is, the prose is lean, economical, methodical; the subject matter takes pre-eminence over the writer's voice. The writing is personalized selectively if at all, for the author's primary aim is to satisfy the reader's need for information, not the writer's need for self-expression. In Warren's words (77, p. 47), technical writers "should be under the same mandates for good writing as other writers, but with a special mandate to be clear and concise." Exactness takes precedence over grace and variety, explains Weisman (78, p. 28). Michael Markel, author of Technical Writing: Situations and Strategies (60, p. 5), agrees: "everything else is secondary" to getting the job done. In good technical writing digressions and unnecessary words or information are eliminated; everything is important, and the language is tightly woven. "Every word advances the writer's meaning. Nothing is wasted," explains John Lannon (55, p. 6) in his book Technical Writing. Exact, specific diction is necessary so that only one interpretation is possible. (Of course audience analysis and adaptation are key factors here, for all these matters are relative to the reader.) The emphasis is on completeness, concreteness, and coherence--a simple, direct, precise, accurate, and economical expression of ideas.

Such plain, unadorned language has been perceived as a stylistic ideal in technical writing ever since the late seventeenth century, but such was not always the case. In fact, in the previous century just the opposite was true. During the Renaissance the classical past was

rediscovered as Latin and Greek texts were unearthed and printed. A newborn passion for the classics led to the exaltation of classical authors, which led in turn to the cultivation of highly rhetorical prose modeled on ornate classical styles. In his article "Science and English Prose Style, 1650-75" Richard Foster Jones (45, p. 977) describes the "luxuriant" prose of the Commonwealth:

> This style is characterized by various rhetorical devices such as figures, tropes, metaphors, and similes . . . . The sentences are long, often obscurely involved, and rhythmical . . . . The penchant for interlarding a work with Latin and Greek quotations is also apparent. The diction reveals a host of exotic words, many Latinisms, and frequently poetic phraseology of rare beauty.

Students of classical rhetoric were taught to amplify their writing, to practice rhetorical devices and expansion, to say things in different ways (63, pp. 13-41). Edward P.J. Corbett (18, pp. 496-97) cites Erasmus' 150 ways of phrasing a simple sentence and explains that such artificial experiments taught students the flexibility of language and extended their range as writers. But in his History of the Royal Society, Thomas Sprat (70, p. 416) expresses a less positive view of such practices. Here is his description of the Ancients' writing about natural knowledge through the abundant use of rhetorical devices:

> The sweetness of Flowers, and Fruits, and Herbs, they had quite devour'd: They had tir'd out the Sun, and Moon, and Stars with their Similitudes, more than they fancy them to be wearied by their daily journeys round the Heavens.

This amplified, rotund style described by Sprat is sometimes referred to as Ciceronian and is in fact typical of Ciceronian oratorical style, but, as Michael Halloran and Merrill Whitburn (39, pp. 60-61) point out, Ciceronian rhetorical theory included three varieties of style: the plain style to instruct, the middle style to delight, and the grand style to promote belief or action. Thus, even

Cicero would have eliminated contrived, noticeable ornamentation in technical or instructional writing. Cicero (14, xxiii 76-79) pointed out that "some women are said to be handsomer when unadorned," and he likened them to the plain style: "All noticeable ornament, pearls as it were, will be excluded; not even curling irons will be used; all cosmetics, artificial white and red, will be rejected." Yet he cautioned that the plain style is not as artless and easily achieved as it may first seem: "When attempted nothing is more difficult." What is often called the Anti-Ciceronian movement, then, is not against Cicero but rather against his imitators who followed his embellished oratorical style even in practical written communication.

The Rise of the Plain Style

In the late seventeenth century more and more writers began to make that difficult attempt advocated by Cicero, to separate practical communication from the imaginative, embellished language they considered more appropriate for poetry and entertainment. Many forces have been given credit for this shift--rationalism, utilitarianism, the scientific movement, the new journalism, the Protestant ethic, the antienthusiasm that was part of the rejection of Puritanism, the typographical revolution, the rise of the middle class. It is most likely that the new trend in technical communication was the result of a medley of cultural forces, but certainly the scientific movement must be among the forefront. The new experimental scientists were less exuberant and less sure of the world than the previous generation, and this uncertainty was reflected in their prose style. To them, as Halloran (40, p. 77) points out, rhetoric had "no intellectual

significance" but was only "verbal cosmetics." Jones (38, pp. 984, 978, 1007, 1008) quotes seventeenth-century scientists and philosophers Francis Bacon, John Wilkins, William Petty, Francis Glisson, Thomas Hobbes, and Robert Boyle to show that "repugnance to the prevailing style and a feeling for the need of a simpler, more direct manner of expression were a characteristic feature of the new science from its very inception." He believes the spirit behind the movement toward plain style had its origin in the scientific movement, specifically in the new scientists' "obsession with the actual nature and appearance of things and their desire to let nothing come between observation and description." Halloran and Whitburn (39, p. 64) agree; they believe the same assumptions that led to the scientific method revolutionized style, and the success of the new science in turn solidified the new stylistic tradition. Certainly utilitarianism was at the core of both the new science and the new prose; both aimed for the most practical method of effecting their goals.

The Royal Society

The new stylistic movement toward plainness in speech and writing was more than just a vague trend. It was given form and impetus by a prestigious group of experimental philosophers and amateur scientists known as the Royal Society of London, the first organized scientific body in England. The Royal Society grew out of the informal meetings in London and Oxford of groups of men who wanted to promote the study of natural knowledge. For almost twenty years before the official formation of the Royal Society, these men met weekly to discuss scientific theories and experiments. Traditional explanations of

natural phenomena no longer seemed satisfactory to them; they wanted to observe, weigh, and measure all things in order to gather reliable evidence about the nature of the world.

As early as 1645 a group was meeting in the lodgings of Dr. John Wilkins at Wadham College, Oxford. In his History of the Royal Society Thomas Sprat (70, p. 53) calls Wilkins' home "the place of Resort for Vertuous, and Learned Men," and Sprat says meetings there "laid the foundation" for the Royal Society. These meetings were especially important to scholars during the time that the Cromwellian civil wars interrupted university studies at Cambridge and Oxford. After the restoration of the monarch in May of 1660, these scholars decided to form a Society of Philosophers. King Charles II promised his support (but no government subsidy) and gave them permission to call themselves the Royal Society. The group petitioned for royal approval of incorporation in September of 1661, and their charter passed the Great Seal on July 15, 1662 (the official date for the founding of the Royal Society).

Sprat (70, p. 57) says "several eminent persons" joined to form the Royal Society--a group of "gentlemen whose inclination lay in the same way." The only official qualification for membership was to be a zealous supporter of the new philosophy (experimental science), yet membership growth was limited; in the early years on the average nine new members were accepted each year (58, pp. 17, 53). The first members were mostly from professional classes and often were skilled craftsmen, but the expense of administration led to the admission of nobility and wealthy patrons; in the early years only about one third of the members were true scientists, while the others were interested

supporters. Dorothy Stimson (71, p. 539; 72, p. 140) calls the Society a "Magnet" that drew men to it and points out that a great deal of "prestige and social prominence" came with election to membership. P.H. Hembdt (41, p. 1053) agrees: "Election to membership in the Royal Society, with the coveted privilege of writing F.R.S. [Fellow of the Royal Society] after one's name, was recognized as a badge of very high distinction." The King often sent questions for the consideration of the Society, and his brother attended some of their meetings--as did visitors from abroad, foreign dignitaries, and many prominent people. King Charles II added to the Society's prestige when he declared that "no patent should be granted for any philosophical or mechanical invention until examined by the Society" (41, p. 1052). Stimson (72, p. 52) points out that the membership roll of the Royal Society from 1662 to the present is "a remarkable record of the greatest scientists in all fields"--not just British scientists, but also Europeans and Americans. Indeed, the Royal Society of London has always been a prestigious, powerful group. As Hembdt (41, p. 1053) notes that the Society soon "became a power for any cause which they agreed to espouse."

One such cause was the plain style. As Jones (44, pp. 20-21) points out, the very character of the new science inspired the stylistic creed of the Royal Society. They emphasized accuracy in recording sensory impressions, and to present a true picture they needed a manner of expression in which words and things were as close as possible; they considered this style "essential to the progress of science." This is evident in Sprat's History (70, pp. 61, 60); the purpose of the Royal Society, he says, is " . . . to make faithful

Records, of all the Works of Nature . . . . " In order to do this, he explains, "they have indeavor'd, to separate the knowledge of Nature, from the colours of Rhetorick, the devices of Fancy, or the delightful deceit of Fables." Their aim was to benefit mankind; they sought "simply to explain and record," and they believed "their results must stand or fall by their own evidence," free of the coloring of rhetoric (13, p. 284). They venerated experiments, according to Sprat (70, p. 91), "not the acuteness of any commentary."

Sprat (70, pp. 111-12) describes the prevailing writing style of the day and the Society's reactions as follows:

> There is one thing more, about which the Society had been most sollicitous; and that is, the manner of their Discourse: which, unless they had been very watchful to keep in due temper, the whole spirit and vigour of their Design, had been soon eaten out, by the luxury and redundance of Speech. The ill effects of this superfluity of talking, have already overwhelm'd most other Arts and Professions . . . . The Ornaments of speaking . . . are so much degenerated from their original usefulness. They were at first, no doubt, an admirable Instrument in the hands of Wise Men: when they were onely employ'd to describe Goodness, Honesty, Obedience; in larger, fairer, and more moving Images: to represent Truth, cloth'd with Bodies' and to bring Knowledge back again to our very senses, from whence it was at first deriv'd to our understandings. But now they are generally chang'd to worse uses: They make the Fancy disgust the best things, if they come sound, and unadorn'd: they are in open definance against Reason . . . . Who can behold, without indignation, how many mists and uncertainties, these specious Tropes and Figures have brought to our knowledge? Of all the Studies of men, nothing may be sooner obtain'd, than this vicious abundance of Phrase, this trick of Metaphors, this volubility of Tongue, which makes so great a noise in the World.

Here Sprat is referring not to a vague, unorganized attempt to achieve simplicity and precision in speaking and writing, but rather a very definite official platform in regard to style. Two years after the Royal Society was established, its members drew up statutes making

their stand official. Here is Sprat's (70, p. 113) description of the Society's efforts to correct stylistic excesses:

> They have therefore been most rigorous in putting in execution, the only Remedy, that can be found for this extravagance: and that has been, a constant Resolution, to reject all the amplifications, digressions, and swellings of style: to return back to the primitive purity, and shortness, when men deliver'd so many things, almost in an equal number of words. They have exacted from all their members, a close, naked, natural way of speaking; positive expressions; clear senses; a native easiness: bringing all things as near the Mathematical plainness, as they can: and preferring the language of Artizans, Countrymen, and Merchants, before that of Wits, or Scholars.

Believing the working class people were closer to nature than the wits and scholars were, the Royal Society insisted that simple, everyday words familiar to the common people be used in papers presented to the Society or published in Philosophical Transactions, their official publication and the oldest scientific journal in the English-speaking world.

Jones (44, pp. 5-24) cites the flowery writings of Society members Sir Kenelm Digby and Dr. Walter Charleton as the reason for such a platform. But regardless of which Society members needed the revisions the Society called for, several men may be credited with giving impetus to the revolt against the ornate style. Perhaps the most notable of these are Francis Bacon and John Wilkins.

Francis Bacon, probably the most important figure in seventeenth-century scientific development, was concerned with accurately recording natural phenomena and sensory impressions, and he advocated a new style of prose--a more concrete prose to match his concrete scientific studies. The utilitarian Bacon was more interested in communication than in expression, and he used different styles on different occasions, adapting to different audiences and different

situations in order to assure effective communication. Consequently, much of his own writing was eloquent and ornamental, yet he called for a plain style of writing; in scientific writing he opposed the use of rhetorical devices and excessive wordiness because he felt they came between men and nature, obscuring communication. Bacon (2, pp. 30, 29) believed the study of eloquence had grown to an excess that he called "the first distemper of learning":

> Men began to hunt more after words than matter; more after the choiceness of the phrase, and the round and clear composition of the sentence, and the sweet falling of the clauses, and the varying and illustration of their works with tropes and figures, than after the weight of matter, worth of subject, soundness of argument, life of invention, or depth of judgement.

Although his death came several years before the founding of the Royal Society, certainly Bacon's rejection of rhetoric in favor of the plain style helped bring about the Society's demand for plain style.

Also influential was Dr. John Wilkins. Francis Christensen (12, p. 179) sees him as the "prime mover" within the Society in regards to influencing seventeenth-century prose style. Wilkins is generally acknowledged as a dominant force in the founding of the Royal Society, and he was one of the two Society secretaries in its early days. He was a member of the Society's first council, serving until his death. While he attended Society meetings he proposed more candidates for membership than anyone else did. Dorothy Stimson (71, p. 552) points out that he served on every important committee dealing with the Society's organization. For example, Wilkins was one of a three-man committee appointed to determine what papers and statutes should be included in the History of the Royal Society written by Sprat under the auspices of the Society, and when questions arose Sprat was sent to

Wilkins' house for decisions. It was Wilkins who was appointed to review Sprat's version of the institution and design of the Royal Society, and it was Wilkins to whom Sprat presented the History on October 10, 1667 (5, I, p. 507; II, pp. 3, 163, 47, 197). Indeed, in writing his History Sprat was acting more as a mouthpiece for Wilkins than as a spokesman in his own right.

Benjamin DeMott (21, p. 10) calls Wilkins "the acknowledged leader of the movement for the reform of language; he represented the movement in the literary and scientific circles of his age." Francis Christensen (13, p. 289) agrees, claiming that "little, if anything" in the Royal Society's stylistic platform had not already been formulated by Wilkins. As a bishop, Wilkins called for a plain style in preaching. As a mathematician, he appreciated the figures and symbols (in mathematics, chemistry, music) that could be read without a language barrier, and he attempted to reduce all ideas and objects to their simplest identities for which he proposed symbols in which the component parts represent aspects of the ideas or objects--a universal symbolic writing of lines, dots, and curves. Although this system was never accepted, Wilkins' Essay Toward a Real Character was widely known in seventeenth-century England and is still studied by students of language history. Wilkins (79, p. 18) believed the "grand imposture of Phrases" had "almost eaten out solid knowledge in all professions," and he felt that the men most esteemed were skilled in nothing but "these canting forms of speech." Much like Bacon and Sprat, Wilkins (79, p. 18) believed that "though the varieties of Phrases in language may seem to contribute to the elegance and ornament of speech," they are in fact "affected" and "contribute to the disguising of it [speech] with false

appearances." Clearly, Wilkins and Bacon supplied key planks in the Royal Society's stylistic platform.

The Influence of the Royal Society: A Critical Summary. Morris Croll (19, p. 185) downplays the significance of the Royal Society's stylistic reform, calling it merely an attempt to lessen the "heat and fever," "prune" the conceits and metaphors, and "restrain the wild motions" of eloquent writing. "But it did not," he insists, "change the form and structure of the prose of its time." George Williamson agrees; in his book The Senecan Amble he argues that the Royal Society "reflected rather than initiated a stylistic reform," and "this reform of style cannot be regarded as exclusive with the Royal Society." Perry Miller (61, pp. 331-62) finds an equally strong stylistic movement among seventeenth-century Puritans who stressed content over form, condemning Latin and Greek citations and rhetorical devices; this would seem to support Croll and Williamson's belief that the Royal Society was not the only voice calling for stylistic reform.

Most scholars, however, believe that the Royal Society's call for stylistic simplicity and clarity had a tremendous impact on not only its own members but on many other prose writers as well. In The Rise of Modern Prose Style Ian Gordon (36, p. 128) calls Royal Society prose "a major discovery in communication. Its influence," he says, "was to dominate the next hundred years. And it is still felt." Martha Ornstein (64, p. 138) says the Society "made it clear that a new order of things had arisen," and it "must therefore be reckoned as first among the pioneer reforming bodies of the century." Jones (45, pp. 1009, 978) believes "science exerted by far the most powerful force upon prose" and the Royal Society's stylistic platform "exerted a

powerful influence on the style of its members even in writings other than scientific." Hembdt (41, pp. 1056, 1054) says the early scientists "shortened the sentence and made it clear and exact," and he points out that within ten years after the Royal Society's founding, the published sentences of Society members dropped from an average of 61 words to just under half that length.

Jones (45, pp. 71-74) cites the essays of Abraham Cowley (1618-67) as evidence of the Royal Society's power to influence writing style. Indeed, many scholars consider Cowley a leader in the transition from the eloquent prose style to the new plain style. Even Williamson (80, p. 282), arguing against the Royal Society's influence, mentions Cowley's stylistic reform and admits the transitional nature of his work. William Minto (62, p. 293) points out that although "fantastic similes are almost the essence of Cowley's poetry, in his prose he is less exuberant. His prose, indeed, is less ornate than any fine writing of the century, prior, at least, to his own date." Cowley was a leader in the secularization of prose--the conscious separation of practical communication from the imaginative, nonutilitarian language of poetry. Even though he was not a member of the Royal Society, he met with the Society's committee for improving the English tongue, and he composed an "Ode to the Royal Society" that prefaces Sprat's History; in this "Ode" Cowley gives glowing praise to Bacon, the new philosophy, the Royal Society, and Sprat's writing. Jones (45, pp. 73-74) concludes that "Cowley must have been keenly and sympathetically aware of the efforts made by the experimental philosophers to discredit the old methods of expression." This conclusion seems justified, and it leads to the further assumption that the Royal Society was

influential in what scholars call Cowley's "decided change in style between his early and later prose" (45, p. 71).

The Influence of the Royal Society: A Case Study. Perhaps the most outstanding example of the Royal Society's immediate and profound influence on prose style is to be found in the writings of Joseph Glanvill, an "enthusiastic, prolific, and contentious propagandist for the experimental philosophy and the Royal Society" (54, p. 274). Although today most readers recognize Joseph Glanvill as the source of Matthew Arnold's Scholar Gypsy or perhaps the source of a quotation in Edgar Allen Poe's Ligeia if they recognize his name at all, in the late seventeenth century he was a man of considerable distinction in England, noted for his roles as both Anglican clergyman and defender of the Royal Society.

Glanvill was born at Plymouth in 1636, the third son of Puritan parents. His family was one of the oldest and most honorable in England and was especially noted for producing a long line of famous lawyers and judges. Glanvill's father, however, was a merchant, and Glanvill was to become a Protestant clergyman.

Nothing is known about Glanvill's boyhood, but he entered Exeter College at Oxford on April 2, 1652, and received his B.A. there on October 11, 1655. He then entered Lincoln College and was awarded his M.A. on June 29, 1658. At Oxford he received a sound foundation in the classics, and there his interest in natural science was kindled.

Immediately after his graduation Glanvill left Oxford to become a chaplain but returned to Oxford the following year. Soon he began to write, and in 1661 he published his first book, The Vanity of Dogmatizing. During the next two decades he published twenty more

books, his last publication coming posthumously in 1882. (Glanvill died November 4, 1680, and was buried at Bath.) Even though several of his publications were revisions and reprints of earlier editions, still he managed to address a great variety of topics--from sermons and invitations to the Lord's Supper to a discourse on experimental science to a defense of the existence of witches.

The influence of the Royal Society on Glanvill's prose style can best be traced in three successive editions of Glanvill's work: in 1661 he published an attack on the scholastic philosophy and entitled it The Vanity of Dogmatizing; or Confidence in Opinions Manifested in a Discourse of the Shortness and Uncertainty of Our Knowledge, and Its Causes; with Some Reflections on Peripateticism and an Apology for Philosophy; in 1665 he published a second edition, adding a prefatory "Address to the Royal Society" and changing the title to Scepsis Scientifica, or Confest Ignorance the Way of Science; in an Essay of the Vanity of Dogmatizing and Confident Opinion, with a Reply to the Exceptions of the Learned Thomas Albius; and in 1676 he published a third and final edition of the same work, this time greatly abbreviated as "Against Confidence in Philosophy," the first of seven essays in Essays on Several Important Subjects in Philosophy and Religion. It was not unusual for Glanvill to revise and reprint earlier works, but this series strikingly illustrates Glanvill's attempt to reject "all amplifications, digressions, and swellings of style" and to achieve the "primitive purity and shortness" that the Royal Society called for; surely even the very titles are evidence of that!

The following chapter will discuss the ways in which Glanvill's style changed as he published the sequential editions of The Vanity of

Dogmatizing and review the critical commentaries that have been made on these changes.

CHAPTER III

THE EVOLUTION OF GLANVILL'S PROSE STYLE

Glanvill's Stylistic Traits

Some aspects of Joseph Glanvill's prose style are fairly consistent throughout his writings. His paragraphs, for example, often begin with but, thus, which, or and. Though the first three of these show sequence and relationship, for Glanvill and is a very loose connective that he very often uses as he piles on details or even moves to a new line of thought. Many Glanvill paragraphs end with a summary sentence or a striking illustration, and many are numbered to tie in with an earlier listing of topics to be covered.

Glanvill uses many antitheses, sometimes in sound (Latinate vs. conversational) as well as in thought. Often the first statement in a sentence is a proposition that is detailed or contrasted in successive clauses (many of which are parenthetical, nonrestrictive, and repetitious). The balanced accumulation of detail and the frequent use of asyndeton give a sense of speed and rhythm--a cadence that is perhaps more typical of orations than of essays (possibly a carryover from Glanvill's preaching). Probably the most striking aspect of Glanvill's style, though, is his overuse of colons and semicolons in places where more modern writers would use periods. This of course leads to massive sentences, and these are very characteristic of Glanvill's style--and of his century. Generally these sentences are

periodic, evolving slowly with the grammatical completion coming only at the end. See Appendix A for randomly chosen sample sentences from other seventeenth-century prose writers. Sentences from Glanvill's contemporaries Robert Burton (1577-1640), Sir Thomas Browne (1605-82), Thomas Fuller (1608-61), John Bunyan (1628-88), and John Dryden (1631-1700) put the length of Glanvill's sentences into perspective and indicate that Glanvill's punctuation and his long sentences were not uncommon for his time.

Not only his punctuation but also Glanvill's capitalization and spelling are inconsistent--and strange by today's standards, though typical in his own day, for Dr. Johnson's Dictionary (1755) had not yet been written and English had not settled down to a consistent form of spelling. Sometimes Glanvill adds a final e to certain words, but sometimes not. He mixes y and i seemingly indiscriminately. He often uses in for the prefix en, and he abbreviates it is as 'tis. Even the typography in which his books are set is archaic--an inconsistent, apparently random combination of Roman, italic, and black-letter type.

The Vanity of Dogmatizing

The very title of Glanvill's first book is a fairly detailed description of its contents as well as an indication of its ponderousness: The Vanity of Dogmatizing: or Confidence in Opinions Manifested in a Discourse of the Shortness and Uncertainty of Our Knowledge, and Its Causes; with Some Reflections on Peripateticism; and an Apology for Philosophy. This book was Glanvill's attack on the pedantic, dogmatic theology and philosophy that claimed infallibility based on the authority of Aristotle and the Latin Fathers. In

Glanvill's words (35, sig. $A2^{v}$), the book "is levied against Dogmatizing, and attempts upon a daring Enemy, Confidence in Opinions. The knowledge I teach," he says, "is ignorance: and methinks the theory of our own natures, should be enough to learn it us." He goes on in the Preface to Vanity to explain that man does not know how he came into the world, how he lives and breathes and reproduces, or where he goes. Pointing out that "the Dogmatist knows not how he moves his finger," Glanvill (35, sigs. $A3^{r}$, B^{r}) concludes that "confidence is arrogance, and Dogmatizing unreasonable presuming."

A month after the publication of The Vanity of Dogmatizing in 1661, John Worthington (81, pp. 299-301), whose extensive correspondence with Samuel Hartlib describes the tendencies of academic thought at Cambridge and elsewhere during this period, wrote to Hartlib that

> There is lately publish'd The Vanity of Dogmatizing or Confidence in Opinions, manifested in a Discourse of the Shortness and Uncertainty of our Knowledge . . . . The author Jos. Glanville [sic], Master of Arts of Oxford. . . . He is a young man, and abating some juvenile heat, there are good matters in his book. As one said of the parts of pregnant young men, we may guess what the wine will be; and it will taste better when broach'd some years hence.

The "juvenile heat" Worthington refers to may be Glanvill's skepticism, but the term applies equally well to his writing style. Two twentieth-century scholars have analyzed Glanvill's style and agree that the style of Vanity is extremely ornamental. Richard Foster Jones (45, p. 989) describes Glanvill's style in Vanity as "highly rhetorical, exuberant, one might even say flamboyant, . . . animated by an enthusiasm great enough to justify the charge of its being rhapsodical." Jackson I. Cope (16, p. 157) (17, p. 247) agrees, pointing out that "in The Vanity of Dogmatizing the metaphors come bubbling up from the wellsprings of Glanvill's agile imagination,

tumbling over one another in an endless rush." He claims the Vanity shows Glanvill's "addiction" to rhetorical excesses, which Jones attributes to Glanvill's recent university training.

Certainly Glanvill's university background in the classics is evident in Vanity, for he often quotes remote authors. But Glanvill (35, p. 142) cites classical authorities more to enlarge his ideas than to enforce them; in Vanity he refers to the "vain Idolizing of Authors, which gave birth to that silly vanity of impertinent citations; and inducing Authority in things neither requiring, nor deserving it." Thus he does not cite ancient authors as a basis for the authority of his argument, but rather as a means of illustrating and amplifying his own ideas. He refers to the ideas of Aristotle, Plato, Descartes, Bacon, Digby, Hobbes--not (as he would say) vainly idolizing them, but merely expanding his theories. Unfortunately for the reader, many of his quotations are in their original Greek or Latin; this leads to what Cope (16, p. 157) notes as "slashing the page with italics."

In addition to numerous Greek and Latin quotations, in Vanity Glanvill uses highly Latinized diction and coins some words of his own from Latin roots. Ferris Greenslet (30, p. 197) lists the Greco-Latin derivatives in The Vanity of Dogmatizing; he points out that Glanvill is the earliest known source for some of these words, indicating that either Glanvill coined them or they were very uncommon until he popularized them. Some of these words--phrenetick, prolepsis, cryptick, dictamen, intellectuals--have survived to the present (with altered spelling in some cases), while others--acquist, digladiations, parvitude, conamen--have faded into obscurity. Greenslet (37, p. 198) refers to these Greco-Latin derivatives as "old friends from Latin

lexicon masquerading in a strange English dress, and he sees this as "one of the chief pleasures to the reader." But for the modern reader and certainly for the working-class readers of Glanvill's day, some of these words create more problems than pleasure. A skimming of the first few pages of Vanity reveals such words as Batrachomyomachia, Effluviums, Corporeity, decoction, avolation, arietations, and angulous. Certainly these are typical of the exotic words and Latinisms Richard Foster Jones mentions as typical of English prose in the third quarter of the seventeenth century--hardly "the language of Artizans, Countrymen, and Merchants" called for by the Royal Society.

Sprat's accusation that the Ancients had worn out similitudes could just as easily be leveled at Glanvill in The Vanity of Dogmatizing. Here hardly a page goes by without a simile of some sort--the intellect is a chameleon, a Schoolman is a ghost of Aristotle, and so forth. Most of Glanvill's poetic similes and conceits are seemingly more to add dignity and beauty than to achieve clarity. The beginning of the second paragraph of Vanity (p. 2) is typical:

> The Eternal Wisdome having made that Creature whose crown it was to be like his Maker, enrich't him with those emnoblements which are worthy him that gave them, and made no less for the benefit of their receiver, then the glory of their Author. And as the Primogenial light, which at first was diffused over the face of the unfashion'd chaos, was afterwards by Divine appointment gathered into the Sun and Stars, and other lucid Bodies, which shine with an underived lustre: so those scatter'd perfections which are divided among the several cantons of created beings, were as it were constellated and summ'd up in this Epitome of the greater World, MAN.

As is usual for Glanvill's early style, here the meaning is not advanced but merely expanded. Often Glanvill (35, p. 119) accomplishes this by restating his key ideas; for example:

> . . . We scarce see any thing now but through our Passions, the most blind, and sophisticate things about us. Thus the Monsters which story relates to have their Eyes in their breasts, are pictures of us in our invisible selves.

This sort of repetitive structure is typical in Vanity, not only in the addition of similes but also in the addition of synonyms in simple phrases. Glanvill (35, p. 39) is never content to say something in only one way; for him, for example, things "interfere, thwart, and obstruct," creating "Ataxy and disorder." Such redundancy, of course, lengthens Glanvill's sentences considerably.

Scepsis Scientifica

In 1665, four years after the publication of The Vanity of Dogmatizing, Glanvill published a second edition of this work, changing the title to the more scientific-sounding Scepsis Scientifica, or Confest Ignorance the Way of Science; in an Essay of the Vanity of Dogmatizing and Confident Opinion, with a Reply to the Exceptions of the Learned Thomas Albius. As this lengthy title indicates, here Glanvill is still quite verbose. He added a 28-page Address to the Royal Society at the front of this volume. Richard Foster Jones (45, p. 989) speculates that Glanvill's coverage of new philosophical thoughts in Vanity probably brought him into "sympathetic contact" with members of the Royal Society, thereby whetting his desire to become a Society member. In this Address he gives glowing praise to the Society: its name, he says, is "August and Glorious," "Illustrious," and "deservedly celebrated"; it is "a Society so much above flattery," "a Constellation of Worthies from whom the Learned World expects to be informed," "a Society, illustrious both by blood and vertue," and "a Society of persons of Quality and Honour, who are embodied for no other

interest but that of the Publique" (34, sigs. $A3^{r}$, $A3^{v}$, $A4^{r}$, $a3^{v}$, $b2^{r}$). If indeed he believes the Society is above flattery, all this seems superfluous. Whatever has whetted his desire, it is readily apparent that he now covets those initials F.R.S. after his name, and he vows allegiance to the Royal Society's stylistic platform. He hopes his "Essay" will benefit mankind and that the Society will "pardon a weak and defective performance to a laudable and well-directed intention" (34, sig. $a2^{v}$). The defectiveness he senses is in part a result of the gravity and complexity of his subject. Glanvill (34, sig. $c2^{v}$) says that when he compares "these worthless Papers," "this little and mean performance" with the vastness of his subject, he is "discourag'd by the disproportion": "And me thinks I have brought but a cockle-shell of water from the Ocean." Glanvill (34, sig. $c3^{v}$) admits that Scepsis Scientifica deserves

> no higher title, then that of an ESSAY, or imperfect offer at a Subject, to which it could not do right but by discoursing all things. On which consideration, I had once resolv'd to suffer this Trifle to pass both out of Print and Memory; But another thought suggesting, that the instances I had given of humane Ignorance were not only clear ones, but such as not so ordinarily suspected.

Thus rationalizing this reissue of The Vanity of Dogmatizing, Glanvill (34, sig. $c4^{r}$) claims he would "have been well content to suffer it to have slipt into the state of eternal silence and oblivion" because he "found so faint an inclination" for it, but he is publishing it again only because he thinks it may be useful to others.

But Glanvill (34, sig. $a2^{v}$) apologizes profusely for yet another defect of his writing--writing that he says "wears a dress, that possibly is not so suitable to the graver Geniusses, who have outgrown

all gayeties of style and youthful relishes." Of the writing style in Vanity Glanvill (34, sigs. $c4^{r-v}$) has this to say:

> For I must confess that way of writing to be less agreeable to my present relish and Genius; which is more gratified with manly sense, flowing in a natural and unaffected Eloquence, then in the musick and curiosity of fine Metaphors and dancing periods. To which measure of my present humour, I had indeavord' to reduce the style of these Papers; but that I was loth to give my self that trouble in an Affair, to which I was grown too cold to be much concern'd in. And this inactivity of temper persuaded me, I might reasonably expect a pardon from the ingenious, for faults committed in an immaturity of Age and Judgment that would excuse them; and perhaps I may have still need to plead it to attone for the imperfections of this Address.

In the words of Glanvill scholar Ferris Greenslet (37, p. 199), here Glanvill "seems to show a receptivity to the changing ideals of his time." But, although Richard Foster Jones (45, p. 991) claims Glanvill "had experienced a true change of heart in stylistic matters," the evidence seems to indicate that Glanvill's openness to change was at this point only lip service to the Royal Society. Certainly his desire for membership in the Society was an ulterior motive for making this dedication and apology to the Society. And indeed, his dedication--complete with its glowing praise of the Society and its aims--was read at a Society meeting December 7, 1664, and his name was proposed for membership, which was granted the following week (5, p. 500).

George Williamson (80, p. 281) claims "there is no real evidence in the 'Address' that Glanvill was either adapting himself to or aware of a Royal Society programme for style." This is only partially true, however. Certainly Glanvill's apologetic confession makes it clear that he was aware of the Society's stylistic platform. Glanvill (34,

sig. c^{v}-$c2^{r}$) seems to understand and approve of the Society's stylist demands:

> And 'tis none of the least considerable expectations that may be reasonably had of your Society, that 'twill discredit that toyishness of wanton fancy; and pluck the misapplyed name of the WITS, from those conceited Humourists that have assum'd it, to bestow it upon the more manly spirit and genius, that playes not tricks with words, nor frolicks with the caprices of froathy imagination: But imploves a severe reason in enquiries into the momentous concernments of the Universe.

Yet Glanvill excuses himself from adapting to the Society's platform. Because only four years have elapsed since the publication of Vanity, his earlier style may not have been entirely the result of "immaturity of age," as he implies. He frankly admits that he was too unconcerned to bother with thorough stylistic revision, and he hopes the Society will pardon him now for the eloquent writing he is too lazy to change. It seems unlikely, then, that he has really made significant stylistic changes, and the fact that he says he may still need to plead "immaturity of Age and Judgment" to "attone for the imperfections" of the Address to the Royal Society prefacing Scepsis indicates that he realizes how little his style has really changed.

Jackson I. Cope (16, pp. 16, 148) says that in Scepsis Scientifica Glanvill "considerably toned down the soaring style" of The Vanity of Dogmatizing, but he admits that Glanvill only "partially sacrificed the old mode." Actually, there are very few changes in either content or style. Two Latin quotations from Vanity (p. 121) are omitted in Scepsis, as is the Scholar Gypsy story. A quote from Montaigne not in Vanity is added in Scepsis (p. 114). Most of the stylistic changes are insignificant, involving the substitution of simple words for more difficult ones--for example, "year" (Scepsis, p. 59) for "annual circle" (Vanity, p. 78), and "earth" (Scepsis, p. 179) for "terraqueous

magnet" (Vanity, p. 244). As Greenslet (37, pp. 200-01) notes, in Scepsis Glanvill omits a few coinings from Latin and Greek and Anglicizes a few Latinate forms (see Table I on the following page for Greenslet's list), but the changes are unimportant. Comparison of corresponding test passages from Vanity and Scepsis used later in this paper will substantiate this; in fact, in one set of parallel passages tested in this study, only one word differs in the Scepsis version from the Vanity version, and it is quite insignificant. (Glanvill adds the word but at the beginning of a paragraph.)

TABLE I

VERBAL CHANGES, VANITY TO SCEPSIS

Vanity	p. #	Scepsis	p. #
touching	passim	concerning	passim
anomie	11	defailance	5
abstrusities	27	difficulties	24
indicate	42	shew	32
embryo thoughts	43	thoughts of our cradle	33
ingenuous	52	ingenious	39
diagnostick	62	evidence	55
graduate	70	advanc't	53
annual circle	78	year	59
dictamens	103	suggestions	75
vitiosity	103	immoralities	76
indubiate	104	unsuspected	76
sublimate	124	sublimed	92
education-propossessions	126	first reflections	93
ingenious perspicill	140	telescope	104
phrentick	186	crasie	139
hegemonical	227	leading	167
terraqueous magnet	224	earth	179

Essays on Several Important Subjects

Glanvill makes much more thorough revisions in his final version of The Vanity of Dogmatizing, which in 1676 he published as "Against Confidence in Philosophy," the first of seven essays in Essays on Several Important Subjects in Philosophy and Religion. Here is Glanvill's (26, sig. a^{v}, $a2^{r}$) description of this book:

> . . . a Collection of some Essays upon subjects of importance. The design of them is to lay a foundation for a good habit of thoughts, both in Philosophy, and Theology. They were some of them written several years ago, and had trial of the World in divers Editions. Now they come abroad together (with some things that are new) reduced to such an Order, as is most agreeable to my present judgment. I could have added much upon such fertile, and useful Arguments; but I am willing to believe, I have said enough for the capable and ingenious, and I doubt too much for others.

Once again Glanvill (26, sig. $a2^{v}$) disclaims having made significant stylistic changes:

> I know it will be no plausible excuse for any of their Imperfections to alledg, that some of them [these essays] were written when I was very young' since they came abroad again in an Age wherein more maturity of judgment is expected: But the truth is, I am not grown so much wiser yet, as to have alter'd any thing in the main of those conceptions. If I had thought it worth the while, I might have been more exact in new modelling, and could perhaps have given them a turn that would have been more agreeable to some phancies, but my laziness, or my Judgment made me think there was no need of that trouble.
>
> The FIRST essay against Confidence in Philosophy, is quite changed in the way of Writing, and in the Order. Methought I was somewhat fetter'd and tied in doing it, and could not express my self with that ease, freedom, and fulness which possibly I might have commanded amid fresh thoughts: Yet 'tis so alter'd as to be in a manner new.

Indeed, though perhaps Glanvill could very well have "been more exact" in his revisions (in fact, most of the essays are practically reprints of previously published works), he has "quite changed" and "alter'd as to be in a manner new" this final version of The Vanity of Dogmatizing.

(The title itself is indicative of that.) In fact, eleven chapters (numbers I, II, VI, XI, XVI, XVII, XVIII, XIX, XX, XXI, and XXII) of Vanity are omitted almost completely in "Against Confidence in Philosophy"--and all thirteen of the remaining chapters are condensed and compressed. Organizational changes are of course necessary to accommodate this economy and are reflected even in the manner in which Glanvill opens the work. Whereas he began Vanity slowly with a chapter of conjectures on the type and extent of Adam's knowledge, in "Against Confidence in Philosophy" he plunges in medias res, in the very first sentence giving his theory on how knowledge can be increased.

As Richard Foster Jones (45, p. 992) says, "A comparison of this essay with the first version affords nothing short of a revelation." Referring to the "general condensation" and the deflation of verbosities and superfluities, Jones (45, p. 997) concludes that here for Glanvill "all the glories of enthusiastic expression and all the joy in beauty have faded into the common light of day." The very fact that Glanvill has condensed a 250-page book into a 33-page essay is evidence that he mercilessly pruned the earlier editions. Although his vocabulary is much less Latinate and now original or unusual Greco-Latin terms are rare, the biggest change is the omission of analogies and illustrations. Most of the illustrations that remain are scientific, and even those are not extended as far as they were in the earlier versions. There are fewer circumulocutions, embellishments, and redundancies, but there is little change in sentence structure. It would seem that eliminating redundancies would create shorter sentences, but Glanvill's excessive use of colons and semicolons persists--and in fact his sentences have grown even slightly longer.

Greenslet (37, p. 201) attributes this to Glanvill's acquiring greater "power over his medium," and perhaps this is a fair explanation; even today longer sentences tend to be associated with mature writing style, and students are taught to combine sentences to avoid primer style.

Royal Society Influence: Critical Commentaries

Just as there is disagreement about the extent of the Royal Society's influence on prose style in general, so there is disagreement about its influence on Glanvill's style in particular. Richard Foster Jones (45, p. 992) is once again the strongest advocate of the Society's influence:

> Under the influence of the Royal Society the author's [Glanvill's] changed stylistic standards had established complete control over his writing, and had caused him to revise with a ruthless hand work written under the inspiration of the great prose writers of the Commonwealth.

Jones (38, p. 1009) believes the extent to which Glanvill's style changed under the discipline of the Royal Society "is a fair gauge of the influence that must have been exerted upon all members of the society, and, through them, upon the outside world."

Robert Adolph (1, pp. 87, 96) agrees that from Vanity to "Against Confidence in Philosophy" Glanvill has made "thoroughgoing stylistic revisions":

> Glanvill's stylistic theory, and actual practice as exemplified in the revisions of the Vanity, reflect the views of the Society, and the evidence suggests that Glanvill consciously modeled his style to suit the Society's ideal . . . .

Adolph (1, p. 6) maintains, however, that "there is no doubt that Jones and his followers have exaggerated the influence of 'science' on prose," and he finds the spirit of utilitarianism to be a stronger

influence than the scientific movement or the Royal Society. Adolph (1, p. 99) points out that Glanvill allied himself with whatever he considered useful for mankind, including the Royal Society, Skepticism, and Anglicanism.

Jackson Cope (17, p. 248) likewise admits that the Royal Society had some influence on Glanvill's prose style; Glanvill's joining the Society "consolidated" his respect for the plain style, Cope says. But Cope (16, pp. 158, 148n.) argues that although there is "a tempering of extravagance" in Glanvill's later works, the changes in subsequent editions of Glanvill's works "are not traceable to any stylistic principle." For Cope (17, p. 246), Glanvill's attitude toward plainness is merely a result of his role as religious apologist for Anglicans:

> The movement toward plainness is mirrored in Glanvill's statements on style, but its contours follow the history of Anglican emphases in the wars of religion rather than the increasing curve of scientific-mindedness in this first "modern" generation . . . .

Cope (17, pp. 247, 250) argues that Glanvill rejects wordiness because he believes it deprives men of the rule of Reason, which is their only means of rebuilding rapport with the Eternal Law expressed through the creation, and he concludes that "it was his role as an Anglican apologist, not as a champion of the new scientific group at Gresham, that dictated Glanvill's outspoken prescription and practice of a new 'plain' style in prose . . . ."

One critic, Morris Croll (19, p. 185), even argues that Glanvill's later style is merely a "revision," not a new style, and he downplays the significance of Glanvill's changes. Others who grudgingly admit a change but give little or no credit to the Royal Society include Henry

Van Leeuwen (75, p. 71), who insists that the Royal Society's scientific spirit was only one of "several forces" influencing Glanvill, and George Williamson (80, p. 282), who insists that Glanvill developed his new style "with no thanks to the Society." Williamson (68, p. 281) points to Glanvill's attribution of his growing distaste for his earlier style to his "humour" and maturity, not the influence of the Royal Society.

It seems a bit simplistic, however, to accept Glanvill's explanation, and it should be noted that when Glanvill first blamed his youth for his early style he was not yet a member of the Royal Society: the most significant changes in his style occur after he has been a Fellow for some time. It seems most likely, then, that in his striving for simplicity and brevity Glanvill was consciously patterning his style according to the dictates of the Royal Society. He was moving away from "the luxury and redundance" condemned by the Society in an attempt "to return back to the primitive purity, and shortness, when men deliver'd so many things, almost in an equal number of words."

Glanvill's appreciation for simplicity, brevity, and clarity is echoed in at least two other works he wrote after becoming a member of the Royal Society. Like his kindred spirit Abraham Cowley, Glanvill heaped praises on Sprat's prose style in the History of the Royal Society. In 1668 in Plus Ultra Glanvill (33, p. 84) praised the History for being "writ in a way of so judicious a gravity and so prudent and modest an expression, with so much clearness of sense," and he explained why he admired Sprat's style:

> The Style of that Book hath all the properties that can recommend any thing to an ingenious relish: For 'tis manly, and yet plain; natural, and yet not careless: The Epithets are genuine, the Words proper and familiar, the Periods

> smooth and of middle proportion: It is not broken with ends of Latin, nor impertinent Quotations; nor made harsh by hard words or needless terms of Art; Not rendered intricate by long Parentheses, nor gaudy by flanting [sic] Metaphors; not tedious by wide fetches and circumferences of Speech, nor dark by too much curtness of Expression.

This passage is evidence that Glanvill's own stylistic ideal in the late 1660s was parallel to that of the Royal Society. And in 1678, two years after publishing Essays on Several Important Subjects in Philosophy and Religion, Glanvill (32, p. 107) wrote in An Essay Concerning Preaching, "This should be the end of a wise man's pains, to conceive things clearly and express them plainly." Certainly these two ideals--conceiving things clearly and expressing them plainly--were key aims not only of Joseph Glanvill but also of the Royal Society.

In order to assess the significance of Glanvill's stylistic changes toward the plain style, in Chapter V I will provide statistical analyses of Glanvill's evolving prose style. These will be based on readability formulas introduced in Chapter IV.

CHAPTER IV

METHOD AND PROCEDURES

Readability Background

Readability is the study of the reading ease of particular passages. Readability formulas are based on counts of language variables in the passages to provide an index of probable difficulty for readers. As early as 900 A.D., religious education leaders (Talmudists) examined early texts, counting words and ideas in an attempt to determine whether style promoted understanding. Much more recent readability studies have been performed in the United States, as early as the study of vocabulary in The McGuffey Readers to determine whether the vocabulary aided understanding. In 1893 L. A. Sherman (68), then Professor of English at the University of Nebraska, conducted a study of sentence length as an indicator of style. He analyzed sentences of famous writers and determined that average sentence length had decreased from 50 words in pre-Elizabethan times to 20-23 words in 1893. He also found a decrease in predication (or increase in simple sentences) which led to shorter sentences. In 1921 E. L. Thorndike (74) published A Teacher's Word Book of Twenty Thousand Words, basing his list on the words' frequency of appearance in print. This book led to the development of readability formulas so widely used today. The first formula for measuring readability was developed by B. A. Lively and S. L. Pressey (56, p. 389) in 1923; they called their

formula "A Method for Measuring the 'Vocabulary Burden' of Textbooks." Today there are more than 50 readability formulas in existence; most are based on two primary factors, sentence length and word load, and most use reading comprehension tests and empirical test of pupils for validation. Nine of the best known and most widely used of these formulas will be used in this study and will be discussed later.

Computerized Readability

The rote counting and mathematical calculations necessary for manual application of readability formulas are not only time consuming but also tedious and subject to error. Although the mathematics used to calculate most formulas is fairly simple, considerable study is necessary before the formulas can be applied. The study required and the sheer drudgery of counting sentences, words, and syllables have long discouraged people from applying more than one formula to any particular text. But today's availability of microcomputers has led researchers to develop programs to perform the counts and calculations of readability formulas, and validation tests indicate that computers can apply these formulas "as well as or better than human beings" (66, p. 561). These programs minimize the work and greatly simplify the use of readability formulas; a further benefit is that they allow researchers to calculate and compare the results of various formulas.

The Schuyler Program

One such program, the one used here, was developed by Michael R. Schuyler, Assistant to the Director of the Kitsap Regional Library in Bremerton, Washington; the program is printed in the March 1982 Journal

of Reading, and the software is marketed by Micro Power and Light Company of Dallas, Texas. One version of the program is written in Applesoft BASIC for the Apple II microcomputer (but can be run with other versions of BASIC). The other version, designed for use with Disk Operating Systems (DOS), runs on the IBM PC, PC XT, and PC jr. (or compatible systems with at least 64K RAM). For this particular study I used the IBM program on a Zenith Data Systems Model ZF-151-52 microcomputer with two disk drives, using the WordStar text file format developed by MicroPro International Corporation (1983).

Schuyler's program accepts up to 500 lines of text (a large enough sample to give a good feel for the readability of a passage), applies nine recognized readability formulas to the text sample, and puts out raw statistics according to these nine formulas: Dale-Chall, Fry, Flesch, Flesch-Kincaid, Gunning Fog, Devereaux/ARI, Coleman, Powers, Holmquist.

Of these formulas, the Dale-Chall, Fry, and Flesch are the best known and the most widely used in human communication research concerned with ease of comprehension based on writing style. All nine formulas give quantitative estimates of readability, and all have been validated by empirical testing. All are good indices of reading difficulty, yet rarely if ever do they all agree (partly because they were not designed to measure the same language variables or even the same grade levels). Even those who have designed the formulas stress the formulas' fallibility: Edgar Dale and Jeanne Chall (20, pp. 16, 19) admit their testing method is "crude" and their formula is not "definitive" but merely "a shortcut in judging the difficulty of written materials." Edward Fry (28, p. 245) warns that "users must

continually be aware that readability scores are estimates"; and R. D. Powers, W. A. Sumner, and B. E. Kearl (65, p. 104) call readability formulas "rough estimates at best." Rudolf Flesch (26, p. 48) points out that even nonsensical ideas can be "readable" according to readability formulas. Often one formula yields a readability level much higher or lower than that yielded by another, but the formulas generally do show a trend--and for the writings of seventeenth-century Joseph Glanvill, a trend is more significant than a reading grade level. As George Klare and Byron Buck (52, p. 142) suggest, readability formulas can serve as valuable tools in assessing whether revisions of an original draft are more or less readable.

The Glanvill Text

In this study I applied the nine formulas previously mentioned to three passages each from Glanvill's The Vanity of Dogmatizing, Scepsis Scientifica, and "Against Confidence in Philosophy" (Essay I of Essays on Several Important Subjects in Philosophy and Religion). Many formulas suggest the tabulation of three separate passages near the beginning, middle, and end of a text to assure a "true" measurement. So I randomly chose passages near the beginning, middle, and end of The Vanity of Dogmatizing that have corresponding passages in the other two sources, and I tested the Vanity passages along with their corresponding passages. This seemed the most fair and most logical way to assess the stylistic changes in the later works. See Appendix B for the first set of tested passages, Appendix C for the second set, and Appendix D for the third set.

I used facsimile copies of the first publications because I could find no trace of the original manuscripts. They are not mentioned by Ferris Greenslet or Jackson Cope or any other Glanvill scholars. My correspondence with Dr. Bruce C. Barker-Benfield, Assistant Librarian at the Bodleian Library in Oxford (3, p.1), was no more fruitful: "I have checked our indexes of manuscripts," he writes, "but no works by Joseph Glanvill are indicated there. I'm afraid I have no idea where else you should look." Dr. John Horden, formerly a professor at the Institute of Bibliography and Textual Criticism, School of English, University of Leeds, and now Director of the Centre for Bibliographical Studies at the University of Stirling in Scotland (43, p. 1), could find nothing about Glanvill's manuscripts. Finally, a letter from Dr. Peter Beal advised me that use of the facsimile copies of the first publications was both reasonable and acceptable. Beal is dealing with Glanvill's period in the not-yet-completely-published Index of English Literary Manuscripts, which is intended to serve as an index to manuscripts of literary works by major British and Irish authors from 1450 to 1900 (67, pp. 233-34). In addition, Beal is a scholar who has a great deal of information about manuscripts not necessarily intended for the Index. Yet Beal (4, p. 1) writes that Joseph Glanvill is not one of the authors intended for the Index, nor does he recall ever having coming across any of his manuscripts. His advice is to assume that the original manuscripts of The Vanity of Dogmatizing, Scepsis Scientifica, and "Against Confidence in Philosophy" are no longer extant.

Adjustments for Glanvill Passages. Noting discrepancies among the results of various formulas, Powers, Sumner, and Kearl (65, p. 104) warn that it is "statistically hazardous" to accept one result as better than another, "especially when the nature of the material on which the formulas are to be used differs from that of the material used in computing the formula." Certainly that is a consideration here, for quite obviously none of the formulas was designed to measure the readability of seventeenth-century scientific prose.

To offset that potential problem, for this study I modernized Glanvill's passages--that is, I updated and Americanized his inconsistent spelling (favour became favor, specifick became specific, easie became easy, avennues became avenues, yeelding became yielding, etc.). These minor changes were necessary so that these words would not be falsely computed as difficult words because they could not be found on the Dale List of 3,000 Words (which I will discuss later).

I made two further adjustments in order that results from the computer program might be as accurate as possible. First, I designated proper nouns as such as I typed them into the computer. A slash (/) immediately preceding these words flagged them so they would not be tabulated as difficult, skewing the results. Because Glanvill's capitalization is erratic and excessive, I used my own judgment in determining which words would be unfairly counted as difficult words. For instance, I ignored Glanvill's capitalization of such words as common sense, brain, soul, musician, and science; I used slashes in front of only proper names and titles. In addition, I used periods only as end-of-sentence indicators--never in abbreviations or after initials. The computer program cannot tell whether a period is marking

the end of a sentence or an abbreviation or initial, so it always counts periods as end-of-sentence indicators. Because sentence count is crucial to all the formulas, the results would be distorted if periods were used other than to mark sentence ends.

Desiring to give Glanvill the fairest possible treatment with the formulas, I considered repunctuating his sentences so that he would not be penalized for the lengthy sentences characteristic of his day. In fact, I ran a set of sample tests with modernized punctuation. I found it difficult to determine whether to eliminate all colons and semicolons or only those I would eliminate in my own writing. In most cases I let any independent clause stand as a sentence, and I was careful to be consistent as I moved from one edition to another. Yet I found that the trends in Glanvill's writing were basically the same, whether I used his punctuation or my own. Because I believe trends are more important than grade levels for the purposes of this study, I chose not to adulterate the formulas by tampering with one of the elements they were designed to measure. Therefore, I have included composite scores for these tests but relegated them to an appendix.

Formulas in the Schuyler Program

So the results will be more meaningful to the reader, the following discussion presents the nine formulas used in Schuyler's readability program package and gives a brief developmental history and documentation of each one.

The Dale-Chall Formula. In 1948 Edgar Dale and Jeanne Chall developed a formula for predicting the readability of material above the fourth-grade level. The formula measures sentence structure (as

indicated by average sentence length) and vocabulary load, using an extensive list of approximately 3,000 words known to 80 percent of a sample of fourth graders. Dr. Dale composed this list by testing fourth graders on their reading knowledge of approximately 10,000 words. This 10,000-word list includes the most common words in Edward L. Thorndike's A Teacher's Word Book of Twenty Thousand Words (measured by frequency of appearance in printed materials), B. R. Buckingham and E. W. Dolch's A Combined Word List (9), and other word lists; Dale tried to include in his list all words fourth graders in the late 1940s could possibly know. He considered a word as known when at least 80 percent of the tested fourth graders checked it as known. The words, of course, are relatively simple; only one-fourth of them contain more than three syllables. (See Appendix E for the Dale list [283-301] and Appendix F for words counted as difficult in a sample passage. Underlined words in the sample are words not on the Dale list and so are counted as difficult. Note the slash before the name Descartes, to prevent its being counted as a difficult word, thus distorting the results.)

Though Dale (20, p. 16) does not claim that his word list is definitive, he points out that "it does present a fairly complete list of familiar and simple words." Dale and Chall applied this list to 376 passages in Books II-V of the 1926 McCall-Crabbs Standard Test Lessons in Reading, counting the number of words in each passage not on the Dale list. These passages of children's readings cover a wide range of difficulty and were already graded in difficulty according to the comprehensibility of questions at the end of each passage (20, p. 15). The McCall-Crabbs tests are based on extensive testing and provide a

statistically convenient method of determining grade scores. Though these tests are the major criteria, Dale and Chall (20, pp. 18, 19) tested their formula to predict the readability of other types of material as well, and this further validation shows that the formula "compares favorably with judgments of experts and with actual reader comprehension."

This testing led Dale and Chall to finalize the following formula to predict the readability of a passage based on its vocabulary load and average sentence length:

$$RGL = 0.1579\ (B4 \times W100) + 0.0496\ (W/S) + 3.6365$$

where RGL = Reading grade level

B4 = Unfamiliar words (words not on the Dale list)

W = Words in the passage

S = Sentences in the passage

The formula is designed for application to material above the fourth-grade level; for primary-level material the formula indicates only "fourth and below." The scores are initially on a scale of 4.9 and below (easy) to 10.0 and above (difficult) but can easily be related to estimated grade levels (see Table II on the following page). The formula does not estimate grade level as precisely as some others do but rather covers two grade levels at a time. Dale and Chall assign the grade levels according to the number of children who can answer one-half to three-fourths of the questions they are asked about the reading materials (questions regarding specific details, importance, vocabulary, etc.). For adults, grade levels relate to the number of years of schooling required to read a passage with ease and understanding (20, p. 19).

TABLE II

DALE-CHALL ESTIMATED READING GRADE LEVELS

Formula Score	Estimated Grade Level
4.9 and below	Grade 4 and below
5.0 to 5.9	Grades 5-6
6.0 to 6.9	Grades 7-8
7.0 to 7.9	Grades 9-10
8.0 to 8.9	Grades 11-12
9.0 to 9.9	Grades 13-15 (college)
10.0 and above	Grade 16+ (college graduate)

The Dale-Chall formula is perhaps the best known and most widely used of all readability formulas. It is respected by reading specialists and praised for its "small error and high prediction power" (65, p. 104), but criticized because it is difficult to apply manually and because it is outdated. It is indeed difficult to apply manually, because each word of a text must be compared to the Dale list--but computerization has certainly minimized that task. The Dale list, developed in the 1940s, is obviously outdated; it contains words such as "candlestick," "fife," and "schoolmaster," but not words more likely to be known by fourth graders, such as "computer," "television," or "video."

This recurring criticism has led to several variations and recalculations of the Dale-Chall formula. Leonard P. Stocker (73)

revised the Dale word list to encompass 204 "Catholic" words such as "sacrament," to make the formula more applicable to reading materials for Catholic schools. Walter R. Brown (6) did a similar revision, adding scientific words because he felt the original formula rated science books as more difficult than they should be rated because commonly known scientific terms were not on the Dale list. Richard D. Powers and John B. Holmquist, whose formulas will be discussed later, used updated versions of the McCall-Crabbs Test Lessons to adjust the Dale list and revise the Dale-Chall formula.

Criticism of the Dale-Chall formula as outdated is probably justified, and Dale and Chall have recently updated their entire formula (but it is not yet in general circulation). Being outdated (from 1940s to 1980s) certainly has no effect on the formula's application to the seventeenth-century writings of Joseph Glanvill, however.

The Fry Graph. In 1962 Edward Fry had a Fulbright lectureship at Makerere College in Uganda, and while there he developed a readability graph to help a group of African teachers who were teaching English as a second language. He later Americanized this graph by adding grade levels (28, p. 243). Although he referred to his method as a formula ("A Readability Formula That Saves Time," Journal of Reading, April 1968), it is actually not a formula but a graph in which the variables of syllables per 100 words (as a measure of vocabulary difficulty) and words per sentence (as a measure of grammatical complexity) are plotted to determine a reading grade level. (See Figure 1 [29, p. 249] on the following page.) Syllables per 100 words are plotted on the horizontal axis; for instance, 108 syllables per 100 words (almost all monosyllabic words) would be plotted on the far left of the graph.

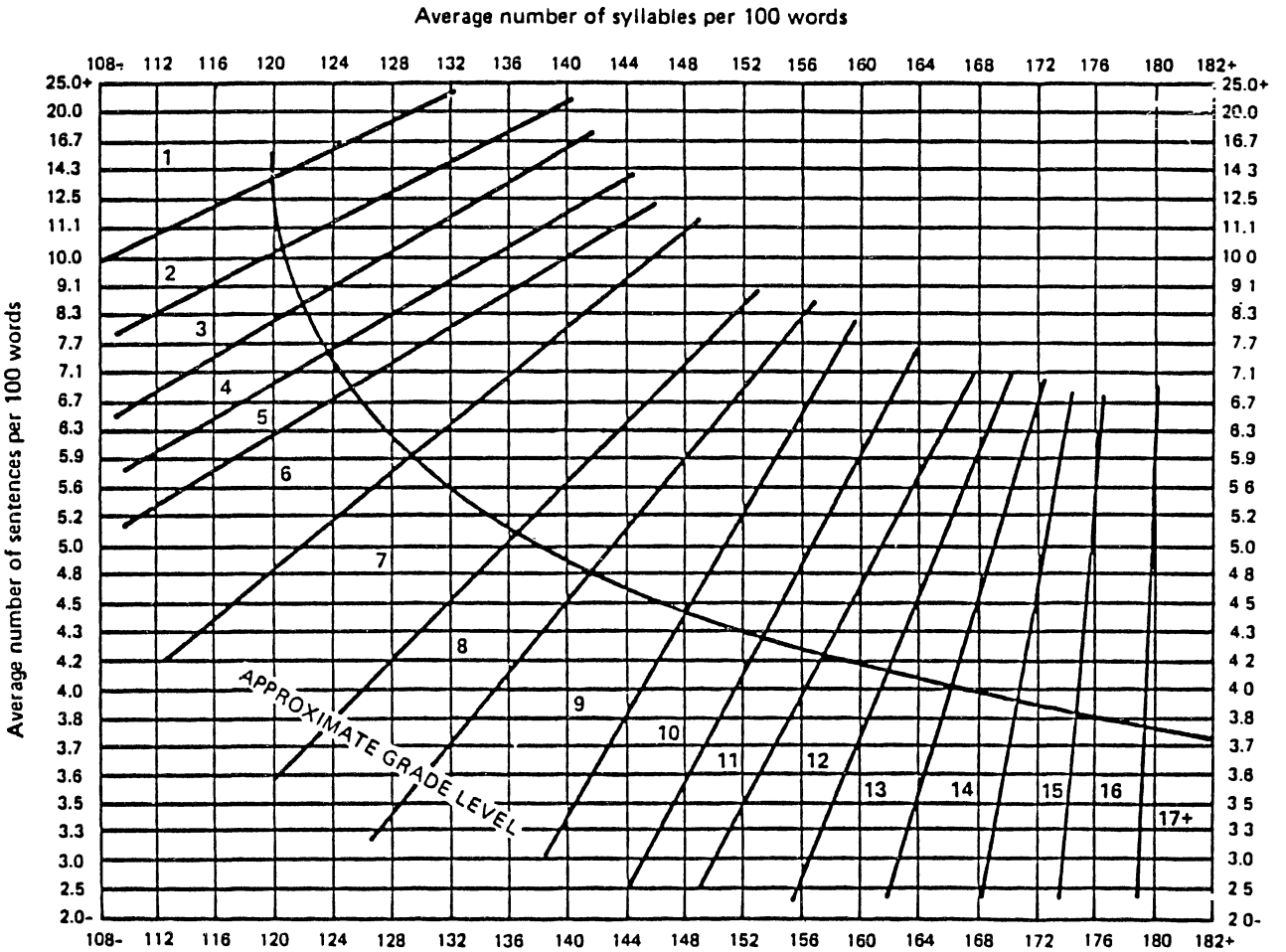

Figure 1. Fry Graph for Estimating Readability

Sentences per 100 words are plotted on the vertical axis; for instance, 25 sentence per 100 words (all four-word sentences) would be plotted at the top of the graph. The Fry Graph thereby shows the grade level at a glance, and it is quite easy to see how that score has been determined.

The curved line in the graph is the smoothed mean of the plots of sample passages--an "eyeball" job, according to Fry (28, p. 243). If several passages with a wide range are plotted, they fall somewhere near the line. Because few books use long words and short sentences or vice versa, most fall into the area near the curve and cross lines. Joseph Glanvill's works often are exceptions, however, because of his heavy use of colons and semicolons.

The Fry Graph is a popular tool for assessing readability, perhaps chiefly because it requires no formula and is so easy to apply manually. Also, it has been validated on both primary and secondary materials, and its scores correlate highly with scores from several well-known formulas (48, p. 77); it "seems to give about the same grade level designations" as the Dale-Chall and Flesch formulas, correlating 0.94 to Dale-Chall and 0.96 to Flesch (27, p. 516). Fry (27, p. 514; 28, p. 15) claims it is accurate "probably within a grade level" and says it "fairly consistently" ranks books at about the same grade level. The calculations used in this study are based on Fry's 1977 extension of his graph.

The Flesch Reading Ease Formula. In 1943 Dr. Rudolf Flesch, a consulting expert on readability for The Associated Press, developed his first readability formula. His book The Art of Plain Talk popularized the concept of readability, and The Art of Readable Writing

gave a new, revised formula for measuring readability. (The latter formula is used here.) In the Preface of The Art of Readable Writing Flesch (25, p. xii) writes, "What I hope for are readers who won't take the formula too seriously and won't expect more from it than a rough estimate." Yet Richard D. Powers (65, p. 104) claims the Flesch formula is "statistically best" of all popular formulas without word lists, and Flesch's formula is one of the most widely used in the history of readability measurement (48, p. 69).

Flesch was interested in adult reading material in terms of both reading ease and reading interest. This study uses his Reading Ease formula, which is based on the Dale List of 3,000 Words. The 1943 version of this formula used three factors: sentence length, number of references to people (personal names, personal pronouns, masculine and feminine words such as uncle or spinster--but not it and they when they do not refer to people or neuter words such as teacher or employer), and the number of prefixes and suffixes. Flesch (24, pp. 221-22) soon realized that counting affixes was confusing and time consuming, counting personal references was misleading, and his scoring system was unsatisfactory. So in 1948 he revised the formula to:

$$RGL = 206.835 - 846 \times L3 - 1.015 (W/S)$$

where RGL = Reading grade level

L3 = Syllables per 100 words

W = Words

S = Sentences

The counting of all syllables for this revised formula is tedious if done manually, but it can be done mechanically more easily than the counting of affixes.

Both the 1943 and the 1948 Flesch Reading Ease formulas use the McCall-Crabbs Standard Test Lessons in Reading (59) as a criterion; at that time Flesch (24, p. 223) believed these were "the best and most extensive criterion that can be found." Of the 376 McCall-Crabbs passages, 13 contained poetry or arithmetic problems; these passages were not included in Flesch's calculations, for he was interested only in prose composition.

The Flesch Reading Ease formula gives a Reading Ease index score of 0 to 100; a score of 0 indicates the material tested is unreadable, whereas as score of 100 indicates the material is very easy reading. A Reading Ease score of more than 100 would indicate the material is lower than the fourth grade reading level. Figure 2 on page 52 shows Flesch's system for arriving at a Reading Ease score (25, inside cover). The index score can be translated to an estimated reading grade level; like the Dale-Chall formula, the Flesch formula computes general grade levels but does not attempt to pinpoint readability to an instructional month. See Table III on page 53 for conversion of Reading Ease Scores to estimated reading grade levels (23, p. 149).

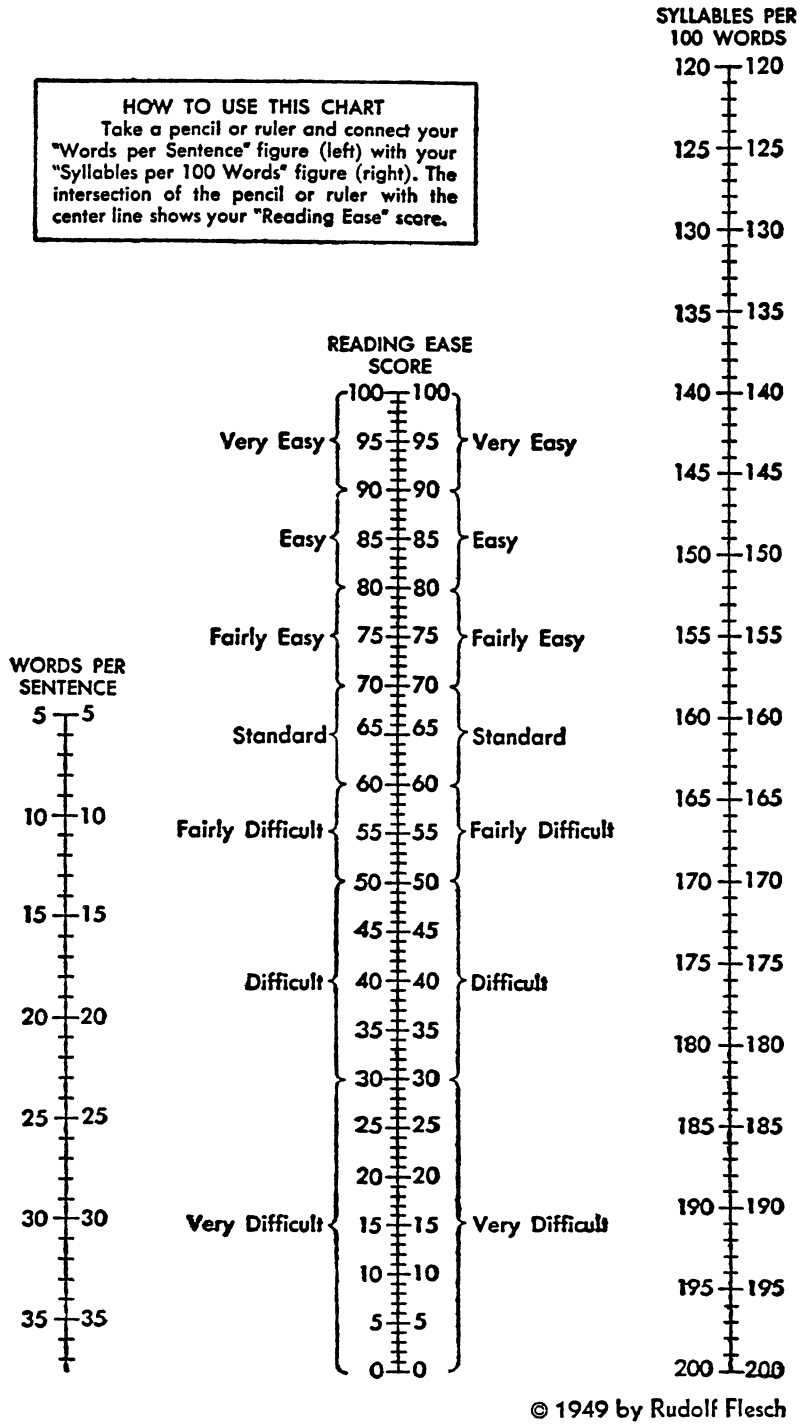

Figure 2. Flesch Readability Yardstick

TABLE III

FLESCH ESTIMATED READING GRADE LEVELS

Description of Style	Average # Words/ Sentences	Average # Syllables/ 100 Words	Reading Ease Score	Estimated Reading Grade
Very Easy	8 or fewer	123 or fewer	90-100	5th
Easy	11	131	80-90	6th
Fairly Easy	14	139	70-80	7th
Standard	17	147	60-70	8th-9th
Fairly Difficult	21	155	50-60	10th-12th
Difficult	25	167	30-50	13th-16th (College)
Very Difficult	29 or more	192 or more	0-30	College Graduate

The Flesch-Kincaid Formula. In 1975 Peter J. Kincaid et al. (46; 47) revised the original Flesch formula to compute grade level directly without first computing a reading ease score and to compute grade levels lower than fourth. Kincaid developed and tested this formula as part of a computer readability editing system for improving the readability of Navy technical manuals and training materials. Based on work with Navy enlisted personnel in technical training, the Flesch-Kincaid formula has become a military standard. This is the formula:

$$RGL = 0.39 (W/S) + 11.8 (Sy/W) - 15.59$$

where RGL = Reading grade level

W = Words

S = Sentences

Sy = Syllables

As might be expected, this formula correlates highly with the original Flesch scores.

The Gunning Fog Index. In 1952 Robert Gunning published his Fog Index in his book The Technique of Clear Writing. His formula is similar to Flesch's Reading Ease formula, but whereas Flesch counts syllables, Gunning counts words of three syllables or more. His aim was to find a formula that is not only reliable but also easy to use, and he believed the portion of polysyllabic words is the best key to word load (38, pp. 31, 35-36). His formula adds the percentage of three-syllable words (expressed as a whole number) to the average sentence length and multiplies the result by the constant 0.4 to arrive at an index score:

$$0.4 (T/W \times 100 + W/S)$$

where T = Three-syllable words

W = Words

S = Sentences

In counting words of three syllables or more, proper names, combinations of short easy words (such as manpower), or verb forms made three syllables by adding -ed or -es are not counted (because they would unfairly skew the percentage of difficult words).

The Fog index can be applied to reading grade levels (38, p. 40) (see Table IV on the following page), and it is easy to apply manually.

Compared to other formulas, it tends to give high scores. Perhaps because it is designed to measure the level of comprehension rather than the level of speaking, the Fog index often assigns a reading grade level of 17 or 18 to material otherwise graded at the high school level (66, p. 567).

TABLE IV

FOG ESTIMATED READING GRADE LEVELS

Fog Index	Reading Grade Level
17	College Graduate
16	College Senior
15	College Junior
14	College Sophomore
13	College Freshman
	Danger Line
12	High School Senior
11	High School Junior
10	High School Sophomore
	Easy Reading
9	High School Freshman
8	Eighth Grade
7	Seventh Grade
6	Sixth Grade

The Devereaux/ARI Formula. In 1961 Edgar A. Smith (69) published the first version of his formula, called the Devereaux formula for the foundation where he worked while developing the formula. This formula is so easily adapted to automation that it is better known as the Automated Readability Index (ARI); because this general term has been applied to several other formulas, there has been some confusion about the Devereaux/ARI formula. The variables in the formula are character spaces per word and sentence length:

RGL = 1.56 word length + 0.19 sentence length - 6.49

This formula is different from other formulas in that it measures word difficulty by counting character spaces (letters, numbers, punctuation marks).

The Coleman Formula. In 1975 Meri Coleman of the University of Texas at El Paso and T.L. Liau of Texas A&M University published a computer readability formula specifically designed for machine scoring. They use an optical scanning device to count words between periods and to count word length measured in letters; this eliminates the necessity of retyping a text that has already been typeset. Believing that word length in letters is a better indicator of readability than word length in syllables, Coleman and Liau (15, p. 283-84) count letters per 100 words and sentences per 100 words. Their formula uses a cloze procedure as a criterion (rather than the more commonly used McCall-Crabbs Test Lessons). In their cloze tests, every fifth word is removed and replaced with a blank for the reader to fill in; only the deleted words are acceptable answers.

The Coleman formula is as follows:

$$\text{Cloze \%} = 141.8401 - 0.2149\,(L1/W \times 100) + 1.079812\,(S/[W/100])/100$$

$$\underline{RGL} = -27.4004 \qquad \text{Cloze \%} = 23.06395$$

where $\underline{RGL}$ = Reading grade level

$\underline{L1}$ = Letters in the passage

$\underline{S}$ = Sentences

$\underline{W}$ = Words

This formula uses basically the same variables as the Fry formula (Coleman = sentences and letters per 100 words, Fry = sentences and syllables per 100 words) and correlates highly with it but tends to grade higher.

The Powers Formula. In 1958 Richard D. Powers, W. A. Sumner, and B. E. Kearl (65) of the University of Wisconsin Department of Agriculture Journalism recalculated the original Flesch formula and three other well-known formulas. They were prompted to make these recalculations by the 1950 revised edition of the McCall-Crabbs Standard Test Lessons in Reading. At least 60 of the 1950 tests contained different subject matter than the original (1926) tests used by Rudolf Flesch and others; recent developments such as World War II and atomic energy added new words to the American vocabulary and thus led to this revision. Powers, Sumner, and Kearl measured the 383 prose passages of the 1950 McCall-Crabbs tests and used these new tests to modernize readability formulas based on the 1926 McCall-Crabbs tests.

The Powers recalculation of the Flesch formula, which is the Powers formula used in this study, measures sentence length and syllables per 100 words:

RGL = -2.2029 + 0.0778 (W/S) = 0.0455 L3

where RGL = Reading grade level

W = Words

S = Sentences

L3 = Syllables per 100 words

This formula gives a grade level score rather than a reading ease index score, but it tends to grade lower than other formulas in the higher grade ranges (65, p. 101).

The Holmquist Formula. Following the 1961 appearance of a new version of the McCall-Crabbs Standard Test Lessons in Reading, in 1968 John B. Holmquist (42) recalculated the Dale-Chall formula. He was concerned that not only the vocabulary but also the reading ability of pupils had changed since Dale and Chall issued their formula, making the Dale-Chall formula inaccurate. He added Brown's list of scientific words and added 102 other words to the Dale list for one new formula, but he also recalculated the Dale-Chall formula by using the original list. The formula used here is one of the several Holmquist formulas; it is a recalculation of the formula using the original Dale List of 3,000 Words. This is the formula:

RGL = (W/S x .0512) + (0.1142 x B4) + 3.442

where RGL = Reading grade level

B4 = Unfamiliar words (words not on the Dale list)

W = Words in the passage

S = Sentences in the passage

This formula tends to grade lower than many others.

Conclusions

The Dale-Chall, Fry, and Flesch formulas attempt to estimate only broad grade ranges of a year or more. The other formulas all are much more specific about grade level, plotting it to two or more decimal places. (This program rounds these results off to two places past the decimal point.) Even two places past the decimal is an attempt to pinpoint reading grade level within three days. Schuyler (66, p. 565) warns that this may lead to a false sense of accuracy. Clearly, such a degree of specificity as some of these formulas yield can be neither consistent nor entirely reliable.

Indeed, uncritical acceptance of any of the formulas may well lead to a false sense of accuracy; it must be remembered that the formulas are no more than estimates. The diversity among the grade levels predicted by the formulas is evidence that readability cannot be precisely determined. For that reason, consideration will be given to aspects not covered by readability formulas, and emphasis will be given here to the leading formulas--Dale-Chall, Fry, and Flesch. The remaining formulas will be considered, but only as they show a trend in the progressive editions of Glanvill's works. At any rate, a trend is far more significant than a grade level in assessing stylistic changes in Glanvill's writings.

CHAPTER V

RESULTS AND DISCUSSION

Readability Comparisons--Test I

The Vanity of Dogmatizing

Pages 32-39

The first passage to be considered from The Vanity of Dogmatizing, pages 32-39, is from the fourth chapter of the book. The passage deals with the nature and performance of the human memory; in particular, Glanvill discusses the theories of philosophers René Descartes, Sir Kenelm Digby, Aristotle, and Thomas Hobbes regarding the function of the memory. The skeptical Glanvill criticizes all four theories and finds no certainty in any of them.

This passage comprises 1,453 words in 35 sentences, averaging 2.41 sentences per 100 words--an average of 41.51 words per sentence. Yet only 177 of the 1453 words--just over 12 percent--are three or more syllables, and the words in the passage average only 1.47 syllables each. (See Table V on the following page.) Though the sentences are quite long, the words are not. And though the sentences are unusually long by today's standards, they were not uncommonly long for Glanvill's day. In fairness to Glanvill it must be noted that to break up his text he often used colons and semicolons where today's writer's would use periods. This passage, for instance, has 16 colons and 20

semicolons, most of which could just as correctly have been periods. (An appendix provides composite test scores when Glanvill's punctuation is modernized; these scores will be referred to later.)

TABLE V

LANGUAGE ELEMENTS IN VANITY, PP. 32-39

Language Variable	Number
Words	1453.00
Syllables	2139.00
Syllables per word	1.47
Three-Syllable words	177.00
Syllables per 100 words	143.23
Sentences	35.00
Sentences per 100 words	2.41
Words per sentence	41.51

As is to be expected, when the nine readability formulas are applied to these statistics, they rate the passage across a wide range of reading grade levels--from as low as seventh and eighth grades (Powers, Holmquist) to as high as college and above (Dale-Chall, Flesch, Flesch-Kincaid, Fog, Devereaux/ARI). Coleman (upper tenth grade) and Fry (eleventh grade) fall near the middle of this range. As was predicted, the Fog, Devereaux/ARI, and Flesch-Kincaid formulas tend to assign the material to the highest grade ranges, with Holmquist and Powers giving the lowest scores. See Table VI on the following page for complete data.

TABLE VI

READABILITY FORMULAS APPLIED TO VANITY, PP. 32-39

Readability Formula	Reading Grade Level
Dale-Chall	College
Fry	11
Flesch	13-16
Flesch-Kincaid	17.97
Gunning Fog	21.48
Devereaux/ARI	20.91
Coleman	10.43
Powers	7.73
Holmquist	8.01

Of the three best-known and most widely-used formulas, the Dale-Chall and Flesch agree, giving a college ranking, and the Fry formula is not far behind, giving an eleventh-grade ranking. A brief glance at the passage reveals such words as "corporeal," "exuvia," "pervious," "tumultuary," "liquidity," and "consonancies"--hardly words one would expect to find on the Dale List of 3,000 Words known to fourth graders. So it is not surprising that the Dale Chall formula rates the passage as difficult reading.

Figures 3 and 4 show how the Flesch and Fry estimated reading grade levels are derived. Figure 3 on the following page applies the language variables of words per sentence and syllables per 100 words to the Flesch Readability Yardstick to arrive at a Reading Ease score of

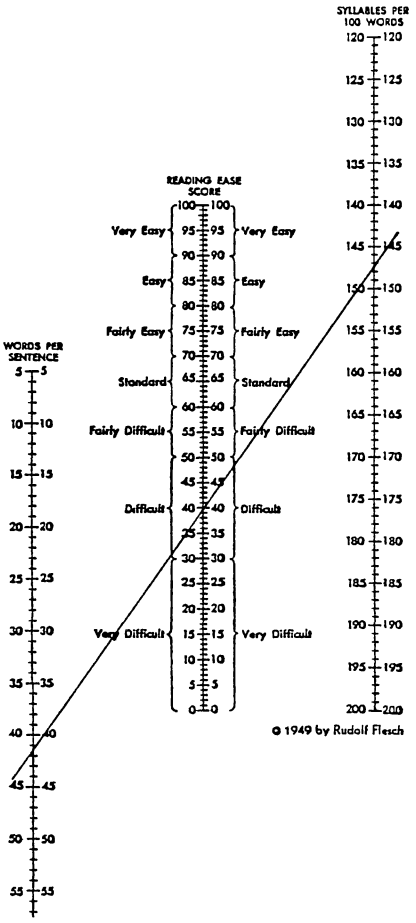

Figure 3. Flesch Readability Yardstick--Vanity, pp. 23-39

40.14, which is rated as difficult reading, or the college level (refer back to Table III for Reading Ease-grade level correlations). The "yardstick" has to be extended to accommodate Glanvill's lengthy sentences. In Figure 4 on the next page the average number of syllables and sentences per words are plotted on the Fry graph, where they fall into the eleventh-grade range.

I will further analyze this passage later, after the corresponding passages in Scepsis Scientifica and Essays on Several Important Subjects have been discussed for comparison.

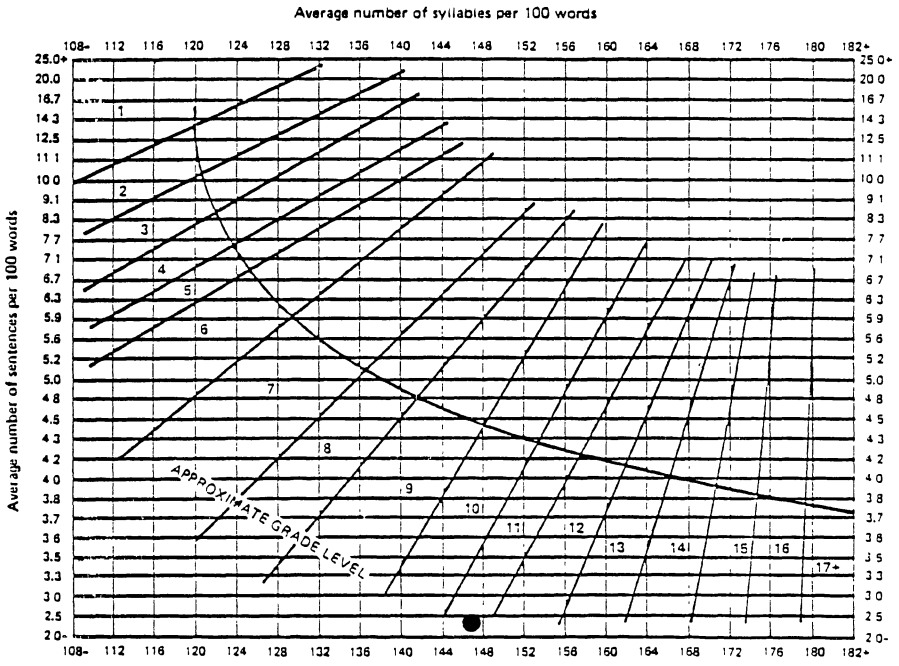

Figure 4. Fry Graph--Vanity pp. 32-39

Scepsis Scientifica

Pages 24-29

The parallel passage in Scepsis Scientifica comes in the sixth chapter. As Glanvill himself admitted in his prefatory Address to the Royal Society, when he wrote Scepsis Scientifica he was too unconcerned to bother making very many changes in the earlier (Vanity of Dogmatizing) version. The beliefs of the same four philosophers (Aristotle, Descartes, Digby, Hobbes) are discussed as they relate to

the capacity and performance of the human memory. Though the philosophies are covered in a different order than they are covered in The Vanity of Dogmatizing, the content and wording are much the same. None of the changes mentioned by Greenslet occurs here, and in fact there are no significant changes in wording. Glanvill has whittled 170 words and five sentences from the Vanity edition, but his sentences here, averaging 42.77 words, are slightly longer than those in The Vanity of Dogmatizing (averaging 41.51 words per sentence). He has dropped eight words of three or more syllables, yet the average syllables per word has risen very slightly, from 1.47 to 1.50. (See Table VII below.) Still, though the sentences are long, the words are not. And although Glanvill has made some punctuation changes, once again, he uses numerous colons and semicolons where periods would no

TABLE VII

LANGUAGE ELEMENTS IN SCEPSIS, PP. 24-29

Language Variable	Number
Words	1283.00
Syllables	1922.00
Syllables per word	1.50
Three-syllable words	169.00
Syllables per 100 words	149.84
Sentences	30.00
Sentences per 100 words	2.34
Words per sentence	42.77

doubt be used today; for example, Glanvill ends the fourth paragraph of this passage with a colon. Though such a practice was not unusual in Glanvill's time, it obviously creates excessively long sentences.

All nine formulas gauge the readability of this passage very close to that of the Vanity passage. The Dale-Chall and Flesch formulas keep the same estimated reading grade level (college), while all seven of the other formulas estimate a slightly higher grade level than the Vanity level. Again, the range is from the seventh and eighth grades (Holmquist and Powers) to college and beyond (Fog, Devereaux/ ARI, Flesch-Kincaid, Dale-Chall, and Flesch), with Fry and Coleman in the middle. See Table VIII below.

TABLE VIII

READABILITY FORMULAS APPLIED TO SCEPSIS, PP. 24-29

Readability Formula	Reading Grade Level
Dale-Chall	College
Fry	12
Flesch	13-16
Flesch-Kincaid	18.77
Gunning Fog	22.38
Devereaux/ARI	21.92
Coleman	10.93
Powers	7.94
Holmquist	8.13

Figure 5 below shows the application of the language variables (words per sentence and sentences per 100 words) to the Flesch Readability Yardstick. The Reading Ease score is 36.66, which is considered difficult reading--3.48 points more difficult than the Reading Ease score for the parallel passage in The Vanity of Dogmatizing but still in the broad thirteenth through sixteenth (college) estimated reading grade level. As with the Vanity passage, the Flesch Readability Yardstick has to be extended in order to measure Glanvill's extremely long sentences.

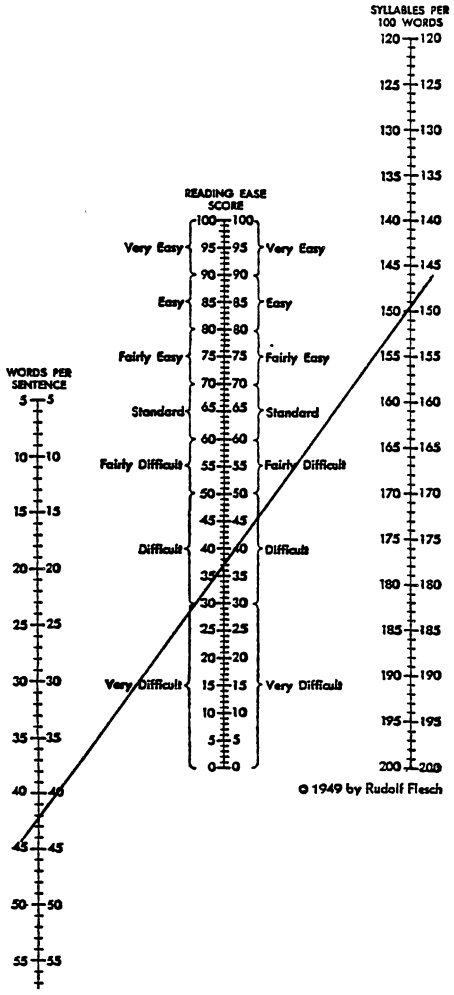

Figure 5. Flesch Readability Yardstick--Scepsis, pp. 24-29

Figure 6 below shows the application of the language variables (average number of syllables and sentences per 100 words) to Fry's graph, yielding a twelfth-grade reading level. This is higher than the eleventh-grade ranking for the Vanity passage, but careful observation shows that the Vanity passage was in the mid to late part of the eleventh-grade range, whereas its corresponding Scepsis passage falls into the early twelfth-grade range--so actually Fry rates these two passages quite closely.

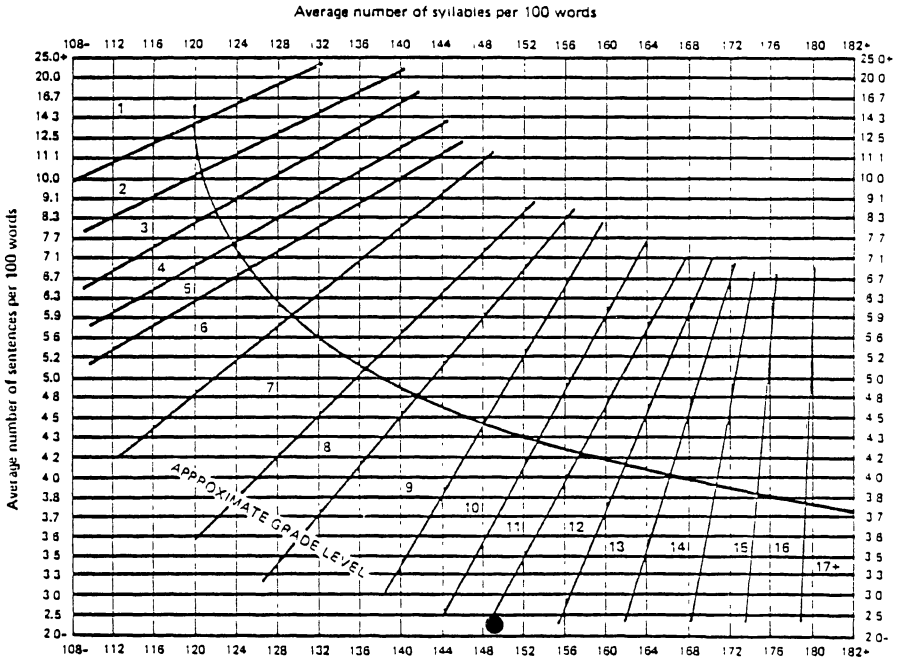

Figure 6. Fry Graph--Scepsis, pp. 24-29

I will discuss this passage later, in comparison with the parallel passage in Essays on Several Important Subjects in Philosophy and Religion.

Essays

Pages 7-9

Pages 7-9 of "Against Confidence in Philosophy, and Matters of Speculation" in Essays on Several Important Subjects in Philosophy and Religion (1676) correspond with pages 32-39 of The Vanity of Dogmatizing and pages 24-29 of Scepsis Scientifica. Here, at last, Glanvill has come to grips with his early exuberance and wordiness. The content is much the same as in the previous two editions, with the philosophies discussed in the same order as in Scepsis Scientifica. But Glanvill has shaved off more than a third of the word count; this passage has 940 words total, down 513 words from the Scepsis passage (which contained 170 fewer words than the Vanity passage). Of the words of three or more syllables, 76 are deleted from the Scepsis version; there are 101 here, for an average of 1.45 syllables per word (down from 1.47 for Vanity and 1.50 for Scepsis). The sentences, however, are Glanvill's longest yet, averaging 47 words each--reinforcing the trend of shorter words, longer sentences. Of course once again Glanvill uses several colons and semicolons where modern writers would most likely use periods, slightly distorting the results in Glanvill's disfavor. (See Table IX on the following page.)

This time Glanvill has made some significant changes in his text, not only pruning excessive words and phrases, but also choosing simpler words. "Review of past impressions" becomes "remembers," "resolution" becomes "account," "avenues" becomes "passages," "midnight compositions" becomes "dreams," "preserve" becomes "keep," et cetera. Gone are "tumultuary agitations," "liquidity," "corporeal exuvia,"

"musical consonancies," and the reference to Oedipus. Glanvill omits the analogy comparing tracks in the mud with pores in the brain, but he keeps the analogies of grains of corn being shaken repeatedly through the same holes of a sieve and of a heap of ants maintaining regular and uniform motions, shortening the latter one considerably. Here Glanvill is more straightforward, changing "we turn our eyes to the Digbean account" to "the hypothesis of Sir Kenelm Digby is next." Yet here he is more personal, changing "it's difficult to apprehend" to "nor can I well apprehend." Above all, the Glanvill of 1676 is much more calm: the question that in 1661 and 1665 threatened to "drive inquiry to despair" now merely "has not yet been very well resolved"!

TABLE IX

LANGUAGE ELEMENTS IN ESSAYS, PP. 7-9

Language Variable	Number
Words	940.00
Syllables	1361.00
Syllables per word	1.45
Three-syllable words	101.00
Syllables per 100 words	144.77
Sentences	20.00
Sentences per 100 words	2.13
Words per sentence	47.00

Despite these changes in favor of simplicity, however, the readability formulas do not unanimously assign lower scores to the

Essays passage than to its Vanity and Scepsis counterparts. (See Table X below.) The rankings are consistent in that Devereaux/ARI, Fog, Flesch-Kincaid, and Flesch are at the top (college and above) and Powers and Holmquist are at the bottom (eighth grade), with Coleman, Fry, and Dale-Chall in the middle. Four of the formulas rank the passage as slightly more difficult than the Scepsis passage, four rank it as slightly less difficult, and one (Flesch) ranks it almost exactly the same. Once again it should be noted that the sentence length is a critical and perhaps distorting factor. Perhaps in this instance the Dale-Chall is the most reliable of the formulas, for it alone puts emphasis on simple language, which is obviously Glanvill's aim.

TABLE X

READABILITY FORMULAS APPLIED TO ESSAYS, PP. 7-9

Readability Formula	Reading Grade Level
Dale-Chall	11-12
Fry	11
Flesch	13-16
Flesch-Kincaid	19.82
Gunning Fog	23.10
Devereaux/ARI	23.30
Coleman	10.07
Powers	8.04
Holmquist	8.00

The Dale-Chall formula recognizes Glanvill's attempts to use simpler words and lowers the estimated reading grade level accordingly--from college for Vanity and Scepsis to eleventh and twelfth grades for Essays. The Flesch formula gives a 36.65 Reading Ease score, down significantly from the Vanity score (40.14) but insignificantly from the Scepsis score (36.66). The Flesch estimated reading grade level is the thirteenth through the sixteenth grade, or college--the same as for the corresponding passages in the earlier works. (See Figure 7 below.) The Fry graph shows an eleventh-grade

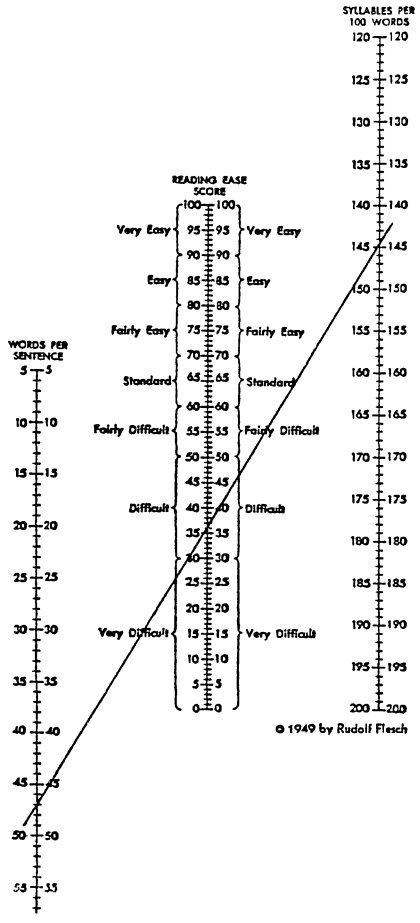

Figure 7. Flesch Readability Yardstick--Essays, pp. 7-9

level, but an earlier (and thus easier) eleventh-grade level than for the Vanity passage, and a full year earlier than for the Scepsis passage. (See Figure 8 below.)

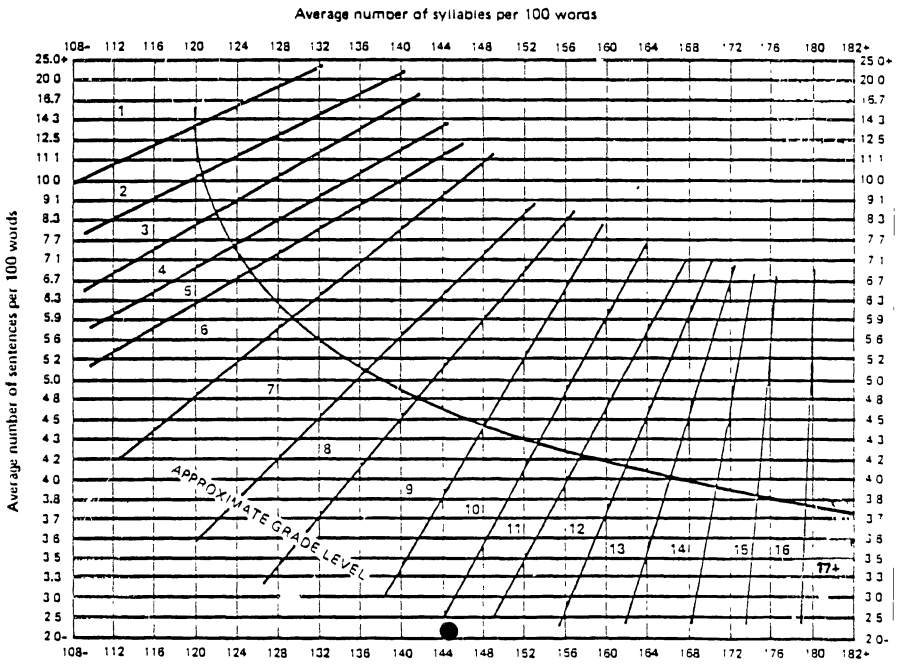

Figure 8. Fry Graph--Essays, pp. 7-9

Readability Comparisons--Test II

The Vanity of Dogmatizing

Pages 117-21

Pages 117-21 of The Vanity of Dogmatizing, the first part of Chapter XIII, were chosen for this study because of their position near

the center of this 250-page book. In this passage the ever-skeptical Glanvill discusses the manner in which human affections--prejudice, passion, and self-interest--lead to error and ignorance.

This passage comprises 663 words in 18 sentences, averaging 36.83 words per sentence. Just under 12 percent of the words are of three or more syllables; the syllable average is 1.46 per word--again, long sentences but short words. See Table XI below.

TABLE XI

LANGUAGE ELEMENTS IN VANITY, PP. 117-21

Language Variable	Number
Words	663.00
Syllables	936.00
Syllables per word	1.41
Three-syllable words	76.00
Syllables per 100 words	141.25
Sentences	18.00
Sentences per 100 words	2.71
Words per sentence	36.83

Readability scores for this passage range from seventh grade to college and college graduate. As usual, Fog, Devereaux/ARI, Flesch-

Kincaid are at the top of this range, with Powers, Holmquist, and Coleman at the bottom. (See Table XII below.)

TABLE XII

READABILITY FORMULAS APPLIED TO VANITY, PP. 117-21

Readability Formula	Reading Grade Level
Dale-Chall	11-12
Fry	10
Flesch	13-16
Flesch-Kincaid	15.44
Gunning Fog	19.32
Devereaux/ARI	17.70
Coleman	9.25
Powers	7.09
Holmquist	7.83

Considering that in this passage are such words as "seducible," "postern," "extensible," and "peremptory," coupled with one Greek and four Latin phrases, the Dale-Chall formula gives this passage an almost surprisingly low ranking of the eleventh-and twelfth-grade reading level. Perhaps these Latin phrases were easily recognized and understood by Glanvill's readers, but one certainly could not expect twentieth-century American fourth graders to know Greek and Latin. The

Greek phrase, "mind without desire," is an Aristotelian quotation. The Latin passages here translate as "Judgment has perished, when matters go into affection"; "We easily believe what we want"; "vice versa"; and "You are one who sets up one premise without hearing the other." Certainly these ideas can be expressed quite clearly in English, making the passage much more easy to read, but Glanvill not only chose to use the Latin and Greek--he did so without translation.

Figure 9 below applies the language variables of words per sentence and syllables per 100 words to the Flesch Readability Yard-

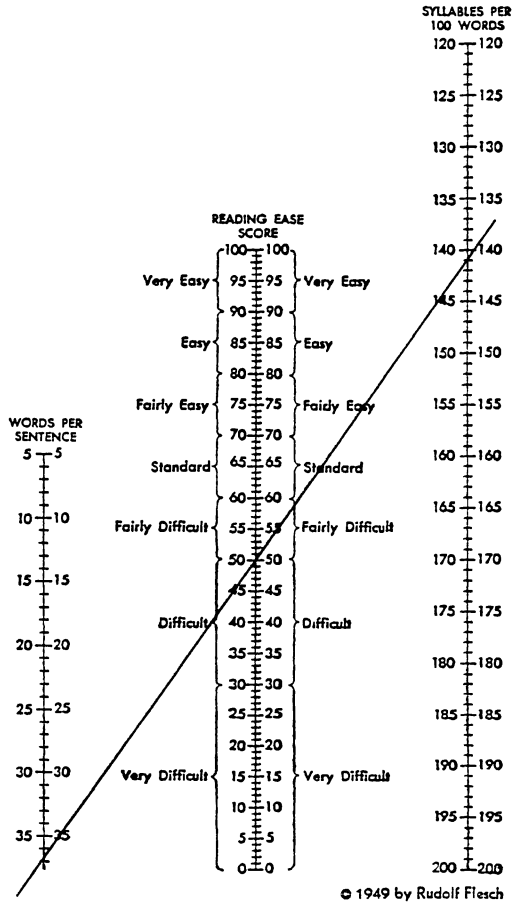

Figure 9. Flesch Readability Yardstick--Vanity, pp. 117-21

stick. The Reading Ease score is 49.95--difficult, college material. This score, however, is extremely close to the breaking point of 59.00, where the rating would change to fairly difficult, high school material. (Review Table III on page 53.) In Figure 10 below the average number of syllables per word and the average number of sentences per 100 words are plotted on the Fry graph. A tenth-grade rating is the result.

I will discuss this passage further in comparison with the corresponding passages in Scepsis Scientifica and Essays on Several Important Subjects.

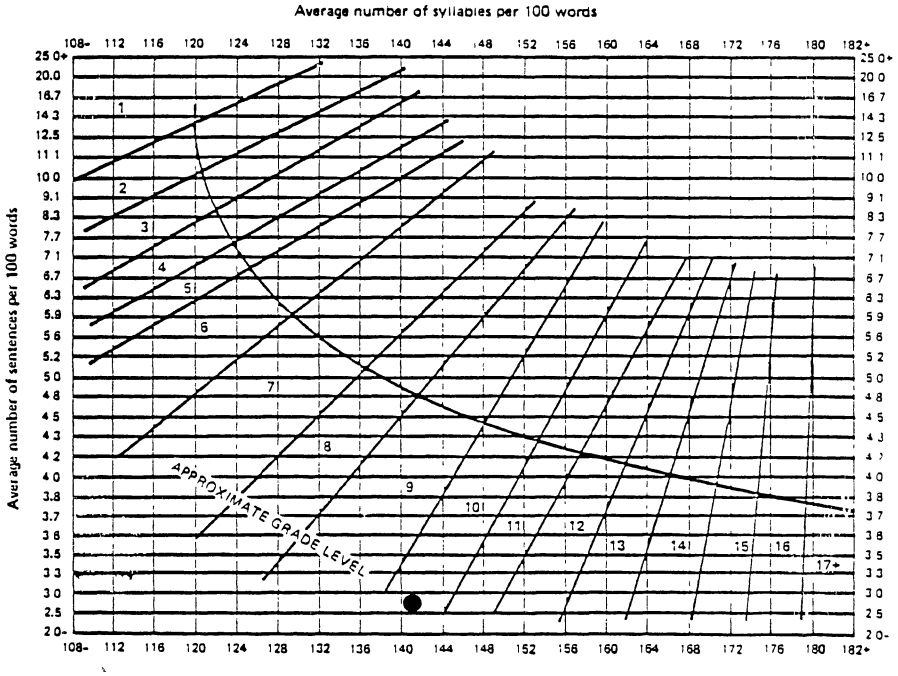

Figure 10. Fry Graph--Vanity, pp. 117-21

Scepsis Scientifica

Pages 86-88

The parallel passage in Scepsis Scientifica comes in the fifteenth chapter. Again, Glanvill has made no significant changes. The sentence count has remained the same while the total word count has risen from 663 to 666. Glanvill's addition of such words as "thus" causes a slight increase in average number of words per sentence, up to 37.00 from 36.83. But, save for the omission of the final Latin phrase, there are no significant revisions. See Table XIII below for language variables.

TABLE XIII

LANGUAGE ELEMENTS IN SCEPSIS, PP. 86-88

Language Variable	Number
Words	666.00
Syllables	937.00
Syllables per word	1.41
Three-syllable words	78.00
Syllables per 100 words	140.71
Sentences	18.00
Sentences per 100 words	2.70
Words per sentence	37.00

Four of the formulas (Devereaux/ARI, Flesch-Kincaid, Dale-Chall, and Fry) rate this passage exactly the same as the parallel Vanity passage, while four (Flesch, Coleman, Holman, and Powers) rate it as insignificantly less difficult and only one (Fog) rates it as slightly more difficult. (See Table XIV below.) These close scores are to be expected, for clearly the language variable counts indicate the ratings should be exactly or very nearly the same as those for the Vanity passage.

TABLE XIV

READABILITY FORMULAS APPLIED TO SCEPSIS, PP. 86-88

Readability Formula	Reading Grade Level
Dale-Chall	11-12
Fry	10
Flesch	10-12
Flesch-Kincaid	15.44
Gunning Fog	19.48
Devereaux/ARI	17.70
Coleman	9.15
Powers	7.08
Holmquist	7.69

Figure 11 on the following page shows the language variables of words per sentence and syllables per 100 words applied to the Flesch Readability Yardstick to arrive at a Reading Ease score of 50.24, which

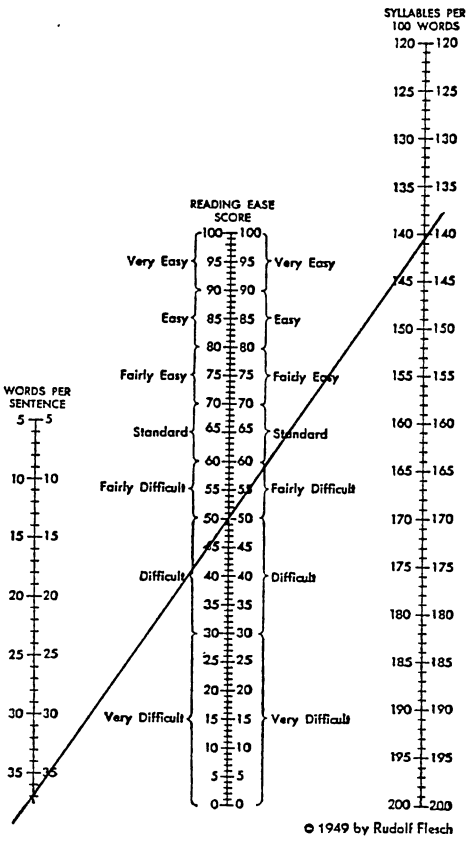

Figure 11. Flesch Readability Yardstick-- Scepsis, pp. 86-88

is rated as fairly difficult reading, or the tenth- through twelfth-grade level. The Flesch "yardstick" is barely long enough to accommodate Glanvill's long (average 37-word) sentences without being extended. It is also noteworthy that the score is only 0.24 of a point away from a college-level rating (review Table III).

Figure 12 on the following page shows the application of the average number of syllables per word and sentences per 100 words to the Fry graph, where they fall into the tenth-grade range.

I will discuss this passage later as it relates to the correspondent text of Essays on Several Important Subjects in Philosophy and Religion.

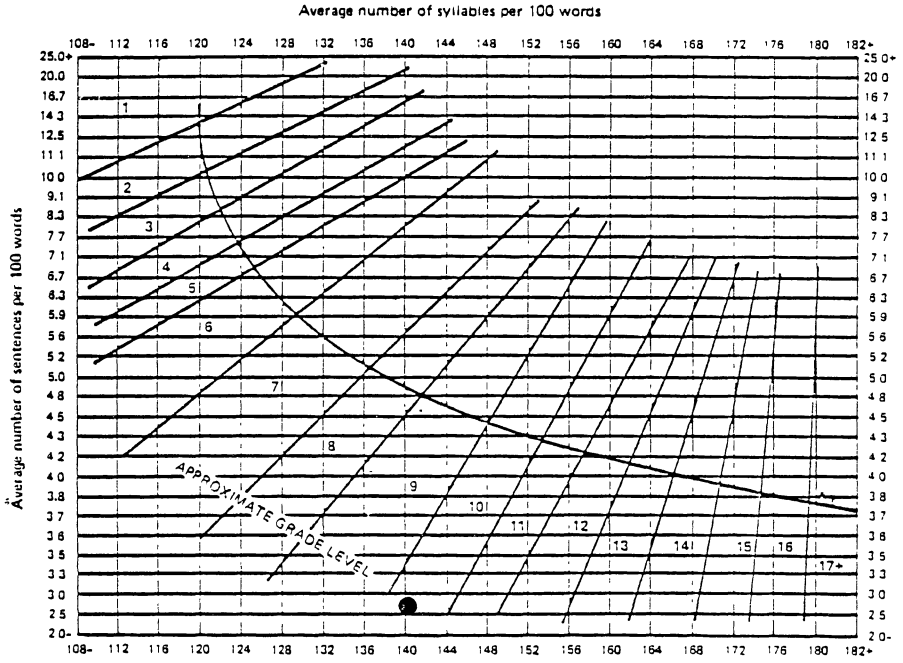

Figure 12. Fry Graph--Scepsis, pp. 86-88

Essays

Pages 22-23

Pages 22-23 of "Against Confidence in Philosophy, and Matters of Speculation" in Essays on Several Important Subjects in Philosophy and Religion correspond with pages 117-21 of The Vanity of Dogmatizing and pages 86-88 of Scepsis Scientifica. This highly condensed version is reflective of Glanvill's mature style; here he covers the same topic in only 273 words, far less than half the number in the earlier works. Likewise, he trims away most of the three-syllable words as he deletes 10 of his original 18 sentences--and the eight remaining sentences are shorter (averaging 34.13 words) than those of Vanity (averaging 36.83

words) or Scepsis (averaging 37 words). (See Table XV below.) Certainly here Glanvill is trying to avoid the "vicious abundance of Phrase" and "volubility of Tongue" condemned by Sprat and the Royal Society.

TABLE XV

LANGUAGE ELEMENTS IN ESSAYS, PP. 22-23

Language Variable	Number
Words	273.00
Syllables	398.00
Syllables per word	1.46
Three-syllable words	30.00
Syllables per 100 words	145.69
Sentences	8.00
Sentences per 100 words	2.93
Words per sentence	34.13

Although a move toward brevity is the most striking change in Glanvill's writing, the readability formulas unfortunately cannot measure that major change (because they measure language according to word lists or according to language variables on an average per 100 words). Some of the formulas (Fog, Devereaux/ARI, Flesch-Kincaid, and Holmquist) rate this passage as easier reading than the Scepsis version, some (Dale-Chall and Powers) rate it exactly the same, and

some (Flesch, Fry, and Coleman) rate it as slightly more difficult (Table XVI below).

TABLE XVI

READABILITY FORMULAS APPLIED TO ESSAYS, PP. 22-23

Readability Formula	Reading Grade Level
Dale-Chall	11-12
Fry	10-11
Flesch	13-16
Flesch-Kincaid	14.91
Gunning Fog	18.05
Devereaux/ARI	16.99
Coleman	10.00
Powers	7.08
Holmquist	7.28

It is a bit surprising that the Dale-Chall formula rating remains constant throughout this set of passages, for in Essays Glanvill has deleted three of the four Latin phrases he used in The Vanity of Dogmatizing. One was exchanged for a rough English translation in Scepsis Scientifica, and that passage plus two of the other original Latin phrases are gone from Essays. Glanvill has obviously aimed not only for brevity but also for simplicity, making such additional changes as the substitution of "ignorance" for "intellectual scarcity."

Other changes include a switch from "Jove" to "Jupiter" and the omission of references to the Tree of Knowledge, Narcissus, and corrupt judicial proceedings--along with a full paragraph of discussion about the Latin phrase meaning "we easily believe what we want." Clearly, Glanvill is here attempting to follow the Royal Society's platform for rejecting "all the amplifications, digressions, and swellings of style."

It seems unfair, then, for the Flesch and Fry formulas to give a higher estimated reading grade level to the Essays passage than to the Scepsis passage. The Flesch Reading Ease score is 48.95, which equates to difficult, college-level reading. (See Figure 13 below.) The Fry

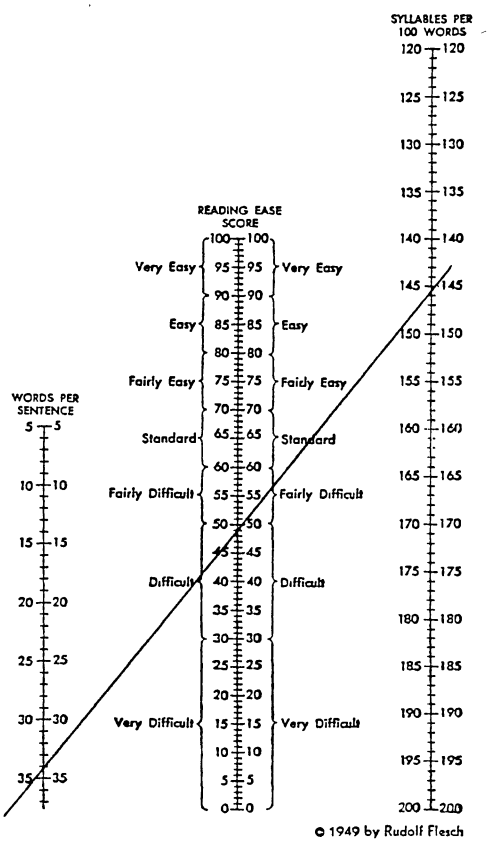

Figure 13. Flesch Readability Yardstick--Essays pp. 22-23

graph (Figure 14 below) shows a borderline tenth-and eleventh-grade level, a few months further advanced than the Scepsis level.

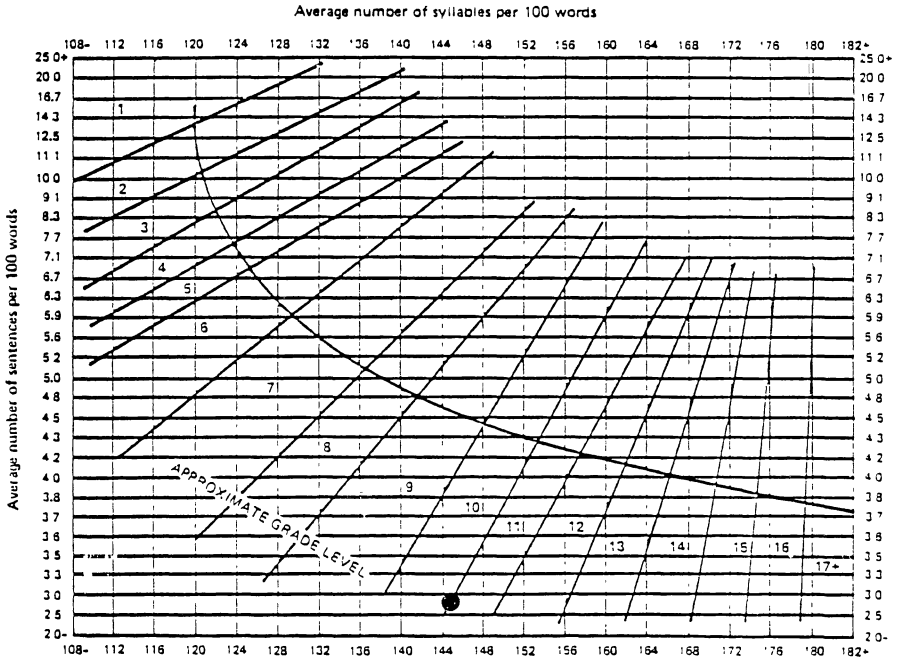

Figure 14. Fry Graph--Essays, pp. 22-23

Readability Comparisons--Test III

The Vanity of Dogmatizing

Pages 210-12

Pages 210-12, part of Chapter XXI of The Vanity of Dogmatizing, were chosen because they came near the end of that book. In this passage Glanvill discusses man's inability to understand anything in nature because of his ignorance of primal causes. Here he strikes the very fundamental principle of skepticism--i.e., mankind has no right to assume the truth or reality of anything simply because of sensitive perception. The subjectivity of perception leads to relativity of knowledge, and Glanvill finds in mankind only "shallow models" of power

and wisdom. Even Descartes, whom Glanvill calls "the Grand Secretary of Nature," presents his theories merely as hypotheses or "supposals" to be tested, and Glanvill commends him for not pretending to know how things were made. For Glanvill all things in nature are connected, so for man to know one thing perfectly, he would have to know all things, including their "true initial causes." This, Glanvill says, "is proper to him only that saw them in the Chaos, and fashion'd them out of that confused mass."

This 411-word passage is 14 sentences long (averaging 29.43 words per sentence). Almost 18 percent of the words are three or more syllables, bringing the average of syllables per word to 1.57. (See Table XVII below.)

TABLE XVII

LANGUAGE ELEMENTS IN VANITY, PP. 210-12

Language Variable	Number
Words	411.00
Syllables	648.00
Syllables per word	1.57
Three-syllable words	73.00
Syllables per 100 words	157.66
Sentences	14.00
Sentences per 100 words	3.40
Words per sentence	29.43

Typically, readability scores for this text range from the seventh and eighth grades (Powers, Holmquist) to college and above (Fog, Devereaux/ARI, Flesch-Kincaid, Flesch, Dale-Chall). Fry and Coleman are not far from the college level, assigning grade levels of 12 and 11.98, respectively. See Table XVIII below.

TABLE XVIII

READABILITY FORMULAS APPLIED TO VANITY, PP. 210-12

Readability Formula	Reading Grade Level
Dale-Chall	College
Fry	12
Flesch	13-16
Flesch-Kincaid	14.45
Gunning Fog	18.86
Devereaux/ARI	16.34
Coleman	11.98
Powers	7.24
Holmquist	8.11

This one-paragraph passage is full of words such as "palpable causalities," "rudiments," "mucous," "oviparous," "terreous," "plantal germinations," "derivations," "feminalities," "palpable phenomena," and "invisible efficients." It is certainly not surprising, then, that

most of the formulas, including the Dale-Chall, rank the passage college-level reading.

Figure 15 below applies the language variables of words per sentence and syllables per 100 words to Rudolf Flesch's Readability Yardstick. The Reading Ease score is 43.91--difficult reading, for the thirteenth through sixteenth grades (college). Figure 16 on the following page plots the average number of syllables per word and average number of sentences per 100 words on the Fry graph. The resultant rating is the twelfth-grade level.

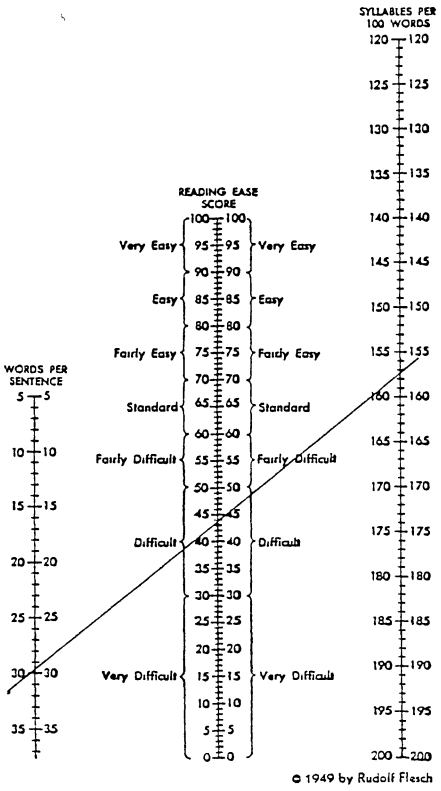

Figure 15. Flesch Readability Yardstick--Vanity, pp. 210-12

I will discuss this passage later as it compares to corresponding passages in Scepsis Scientifica and Essays on Several Important Subjects in Philosophy and Religion.

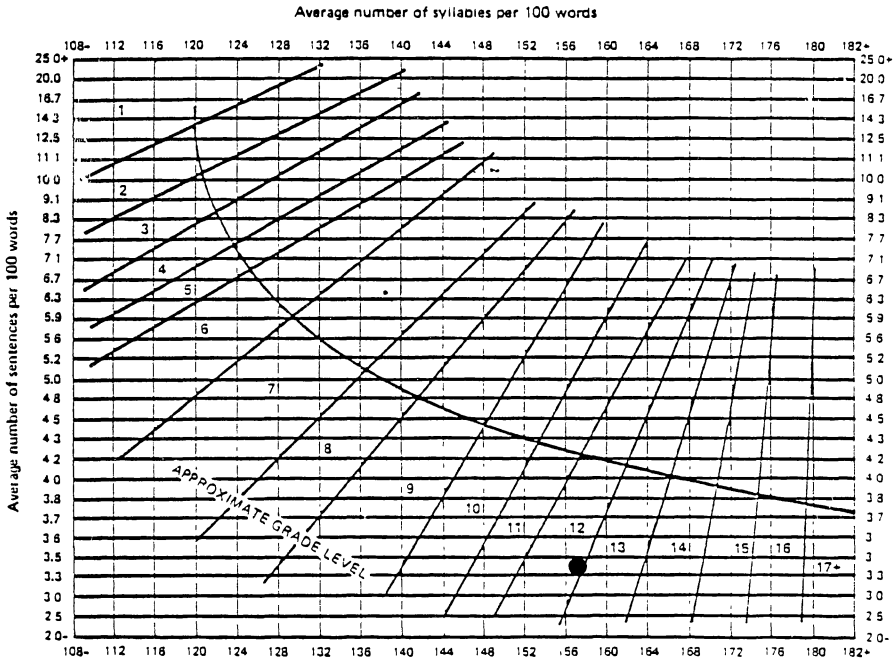

Figure 16. Fry Graph--Vanity, pp. 210-212

Scepsis Scientifica

Pages 154-56

The parallel passage in Scepsis Scientifica comes early in the twenty-fifth chapter of that book. With the exception of the addition of the word "but" at the very beginning of the passage, there is no change from the Vanity version. If would be redundant, then, to repeat tables and figures here that would have at most only minute differences from those just presented for the Vanity passage. Instead, I will cover this passage in more detail in comparison with the Essays passage corresponding to it.

Essays

Pages 15-16

Pages 15-16 of "Against Confidence in Philosophy" in Essays on Several Important Subjects in Philosophy and Religion correspond in content to pages 210-12 of The Vanity of Dogmatizing and pages 154-46 of Scepsis Scientifica. This time Glanvill cuts the passage almost in half, making significant changes. Now there are only four sentences, though they are quite long--Glanvill's longest yet, averaging 55 words each. (See Table XIX below for complete statistics.)

TABLE XIX

LANGUAGE ELEMENTS IN ESSAYS, PP. 15-16

Language Variable	Number
Words	220.00
Syllables	318.00
Syllables per word	1.45
Three-syllable words	24.00
Syllables per 100 words	144.57
Sentences	4.00
Sentences per 100 words	1.82
Words per sentence	55.43

Because of the ponderous sentences, this passage will not fare well with the readability formulas. The Powers and Holmquist scores remain low (eighth grade level), Coleman and Fry give high school rankings, and Dale-Chall gives a college rating--but all the other scores skyrocket. And even though their ratings are low, the Powers and Holmquist formulas agree with the Fog, Devereaux/ARI, Flesch-Kincaid, and Flesch formulas that this is the most difficult passage tested. (See Table XX below.)

TABLE XX

READABILITY FORMULAS APPLIED TO ESSAYS, PP. 15-16

Readability Formula	Reading Grade Level
Dale-Chall	College
Fry	11
Flesch	College Graduate
Flesch-Kincaid	22.92
Gunning Fog	26.36
Devereaux/ARI	27.26
Coleman	10.12
Powers	8.65
Holmquist	8.44

The Flesch Reading Ease score for this passage is 28.70, the lowest average of all the passages tested; this score equates to college graduate estimated reading level. Again the "yardstick" must be lengthened for Glanvill's long sentences. (See Figure 17 below.)

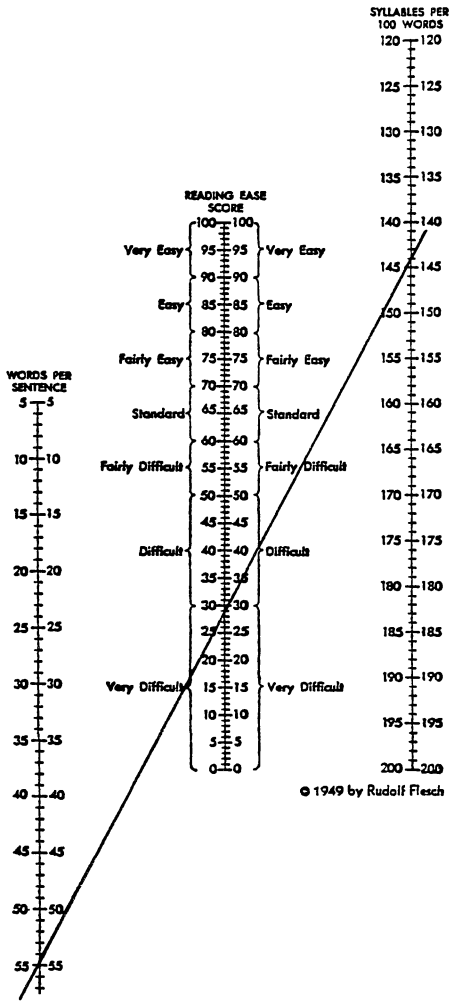

Figure 17. Flesch Readability Yardstick--Essays, pp. 15-16

It is perhaps misleading to assign such a low Fry score to this text, for actually even the extended Fry graph used here cannot accommodate Glanvill's excessively long sentences. Even though Edward

Fry extended his graph in 1977, the average number of sentences per 100 words (1.82) is lower than anything he anticipated (see Figure 18 below).

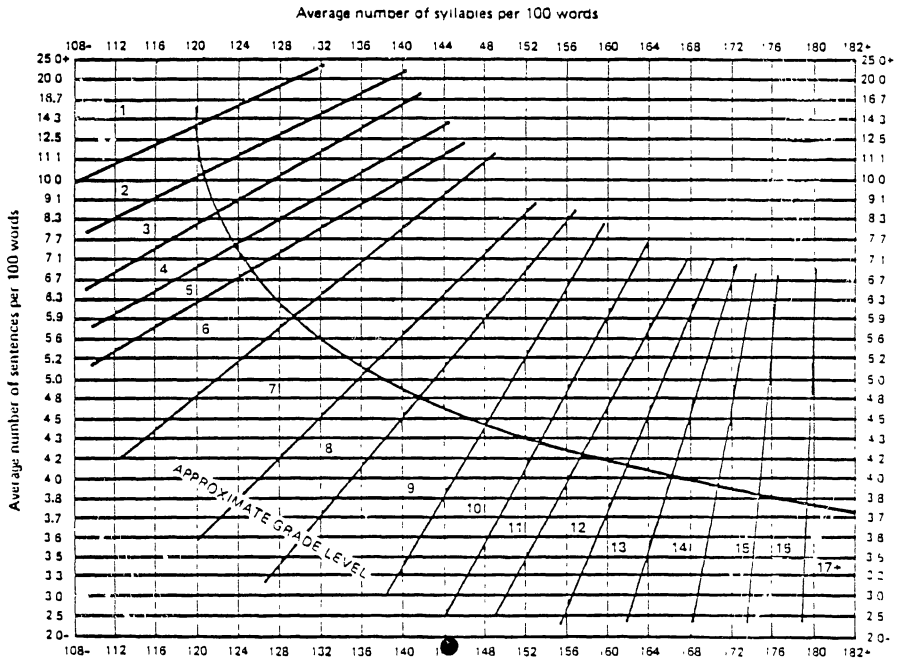

Figure 18. Fry Graph--Essays, pp. 15-16

Once again Glanvill's liberal use of colons and semicolons in places where writers today would use periods penalizes him in the readability formulas. Also, they cannot give him credit for the brevity in this passage, as compared to the earlier versions. Not only does he omit more than 100 words in one chunk near the end of the original passage, but also he effects economy by making substitutions of more simple, less wordy phrases--"first" replaces "true initial,"

"sperm" replaces "mucous sperm," "bird" replaces "oviparous production," "plants" replaces "plantal germinations," et cetera. "No cement to unite them, nothing to keep them in the order they were set" has become simply "nothing to unite them." Also gone are "palpable causalities," "terreous humidity," "vegetable derivations," and "palpable phenomena." Again and again Glanvill whittles away at the deadwood. Clearly, he has made some significant changes and tremendous improvements here. These changes will be given further consideration and evaluation in the following chapter.

CHAPTER VI

SUMMARY AND COMPARISONS

Composite Scores

To complete an assessment and evaluation of the readability of the tested passages, I will now summarize the individual scores for each work into a composite score for that work. A comparison of composite scores can then reveal trends in Glanvill's writing from 1662 to 1676.

The Vanity of Dogmatizing

The three passages tested from The Vanity of Dogmatizing (1662) comprise a total of 2528 words in 67 sentences. The sentences average 37.73 words each, and the words average 1.47 syllables each (see Table XXI on the following page).

As has been noted, these sentences, though long by today's standards, were not extraordinary for the seventeenth century. If periods were substituted for colons and semicolons each time they separate independent clauses, the sentence length would drop drastically. (See Appendix G for composite scores with modernized punctuation.) And by either seventeenth-century or twentieth-century standards, the average word length could not be considered excessive. But even though the average is low, in Vanity Glanvill uses many Greco-Latin derivatives and polysyllabic words.

TABLE XXI

COMPOSITE SCORES: LANGUAGE ELEMENTS IN VANITY

Language Variable	Number
Words	2528.00
Syllables	3724.00
Syllables per word	1.47
Three-syllable words	326.00
Syllables per 100 words	147.30
Sentences	67.00
Sentences per 100 words	2.65
Words per sentence	37.73

Because most readability formulas emphasize the correlation of short sentences with readability, most formulas classify The Vanity of Dogmatizing as college-level reading. As is typical, Powers and Holmquist give the lowest estimated reading grade levels (seventh grade) while the Gunning Fog Index and the Devereaux/ARI and Flesch-Kincaid indexes show the highest levels (college graduate). The Dale-Chall and Flesch formulas agree that Vanity is college-level reading, while the Fry and Coleman formulas indicate a slightly lower level. Figures 19 and 20 on the following page depict the application of the Flesch and Fry formulas to the tested passages from The Vanity of Dogmatizing, and Table XXII on page 98 gives the composite scores for the readability formulas applied to Vanity.

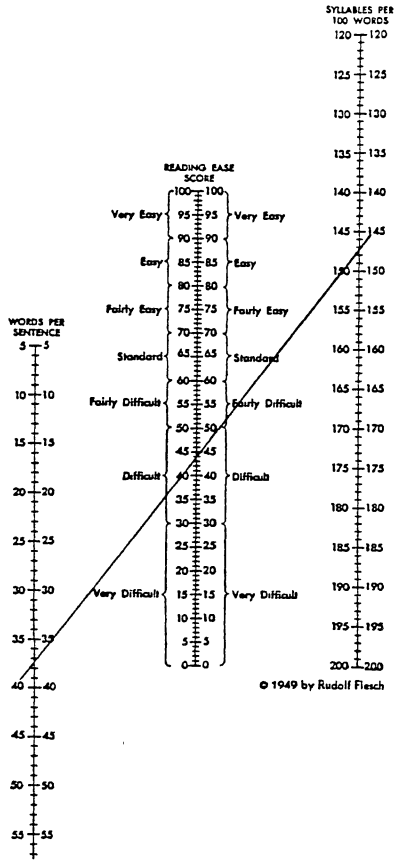

Figure 19. Flesch Readability Yardstick--Vanity Composite

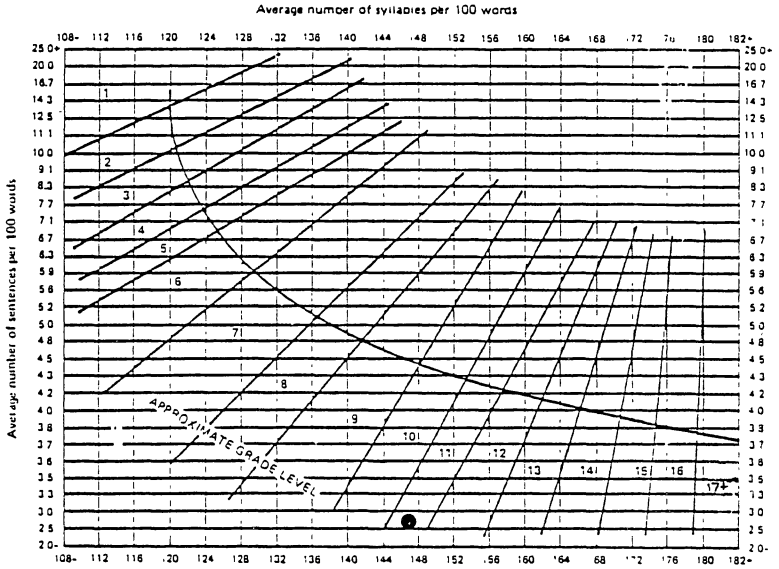

Figure 20. Fry Graph--Vanity Composite

TABLE XXII

COMPOSITE SCORES: READABILITY FORMULAS APPLIED TO VANITY

Readability Formula	Reading Grade Level
Dale-Chall	College
Fry	11
Flesch	13-16
Flesch-Kincaid	16.51
Gunning Fog	20.25
Devereaux/ARI	19.03
Coleman	10.37
Powers	7.43
Holmquist	7.95

Scepsis Scientifica

The passages in Scepsis Scientifica (1665) that in content parallel the tested passages in The Vanity of Dogmatizing are a total of 167 words shorter than the Vanity passages. The 2361 words here are in 62 sentences averaging 38.08 words each; thus Glanvill's already massive sentences have slightly increased in length despite his feeble attempts at revision. Significantly, this trend is the same even when more modern punctuation is used (as shown in Appendix G). Likewise, the average of syllables per word has increased almost too little to measure, to 1.49 (see Table XXIII on the following page).

TABLE XXIII

COMPOSITE SCORES: LANGUAGE ELEMENTS IN Scepsis

Language Variable	Number
Words	2361.00
Syllables	3509.00
Syllables per word	1.49
Three-syllable words	321.00
Syllables per 100 words	148.60
Sentences	62.00
Sentences per 100 words	2.63
Words per sentence	38.03

As should be expected, the insignificant changes in Scepsis from the Vanity edition result in only slight changes when the readability formulas are applied. The formulas, for the most part based on sentence length and word length, reflect the slight increases in sentence and word length--but the changes in the estimated grade levels are almost imperceptible, as are Glanvill's changes in Scepsis Scientifica. Again, the scores range from seventh grade (Powers and Holmquist) through high school (Coleman and Fry) to college (Dale-Chall and Flesch) and beyond. (See Figures 21 and 22 on the following page for Flesch Readability Yardstick and Fry Graph on composite scores for Scepsis Scientifica, and Table XXIV on page 101 for composite readability scores for Scepsis.)

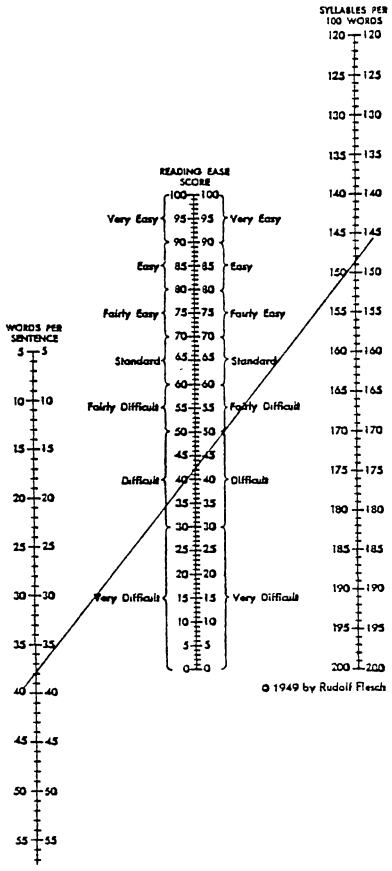

Figure 21. Flesch Readability Yardstick--Scepsis Composite

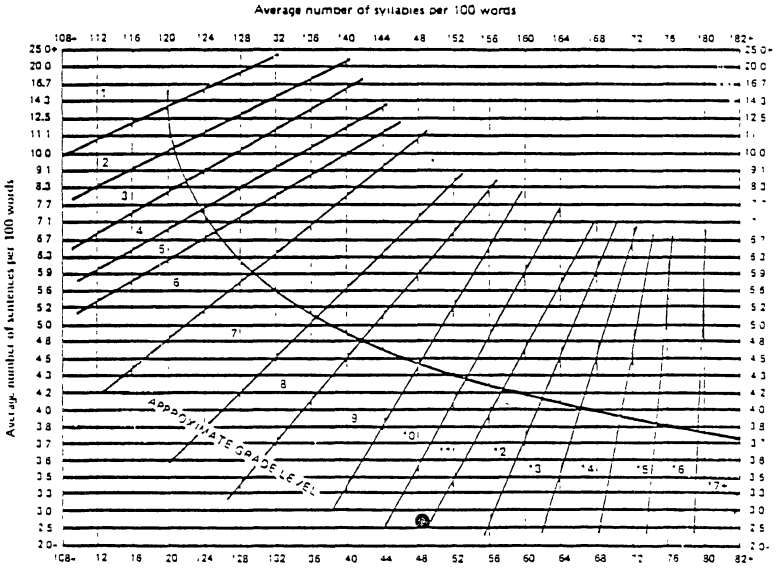

Figure 22. Fry Graph--Scepsis Composite

TABLE XXIV

COMPOSITE SCORES: READABILITY FORMULAS APPLIED TO *SCEPSIS*

Readability Formula	Reading Grade Level
Dale-Chall	College
Fry	11
Flesch	13-16
Flesch-Kincaid	16.80
Gunning Fog	20.67
Devereaux/ARI	19.40
Coleman	10.62
Powers	7.52
Holmquist	7.97

Essays

The final (1676) version of *The Vanity of Dogmatizing*, condensed to an essay in *Essays on Several Important Subjects in Philosophy and Religion*, is significantly altered from the two previous editions. As Glanvill indicates in the Preface to this volume, this version of *Vanity* is "quite changed in the way of Writing."

The length of the combined *Essays* passage (1433 words) contrasted to the lengths of the two parallel sets of passages in *Vanity* (2528 words) and *Scepsis* (2361 words) is evidence of the most striking change in Glanvill's writing style--an obvious change toward the "primitive

purity and shortness" advocated by the Royal Society. See Table XXV below for composite scores of language variables in the Essays passages.

TABLE XXV

COMPOSITE SCORES: LANGUAGE ELEMENTS IN ESSAYS

Language Variable	Number
Words	1433.00
Syllables	2077.00
Syllables per word	1.45
Three-syllable words	155.00
Syllables per 100 words	144.92
Sentences	32.00
Sentences per 100 words	2.23
Words per sentence	44.78

Gone are most of the illustrations and analogies used in Vanity and retained in Scepsis, and many that are still retained are shortened. By far the most striking of Glanvill's stylistic revisions is the elimination of his copious illustrations--illustrations which did not advance the key ideas but merely restated them.

Table XXV on the previous page shows another trend in Glanvill's maturing style: a shift toward shorter words. The composite average for word length in Essays is 1.45, down from 1.47 in Vanity and 1.49 in Scepsis. Here Glanvill abruptly reversed the Scepsis trend toward longer words by using less Latinate vocabulary.

Despite these important changes, however, the passages tested from Essays do not fare well with some of the readability formulas (see Table XXVI below). The formulas that typically give the highest

TABLE XXVI

COMPOSITE SCORES: READABILITY FORMULAS APPLIED TO ESSAYS

Readability Formula	Reading Grade Level
Dale-Chall	11-12
Fry	11
Flesch	13-16
Flesch-Kincaid	18.97
Gunning Fog	22.24
Devereaux/ARI	22.21
Coleman	10.06
Powers	7.87
Holmquist	7.88

estimated reading grade levels (Fog, Devereaux/ARI, and Flesch-Kincaid) assign these passages a higher rating than they assign the passages from either of the two previous editions. So does the Powers formula, which typically gives the lowest score of all the formulas (as it again does here). The Flesch and Fry formulas predict the same reading grade level for Essays as for Vanity and Scepsis (see Figure 23 below and Figure 24 on the following page), while the Dale-Chall, Coleman, and Holmquist formulas estimate that of the three works considered, Essays is the lowest on the scale of reading grade level.

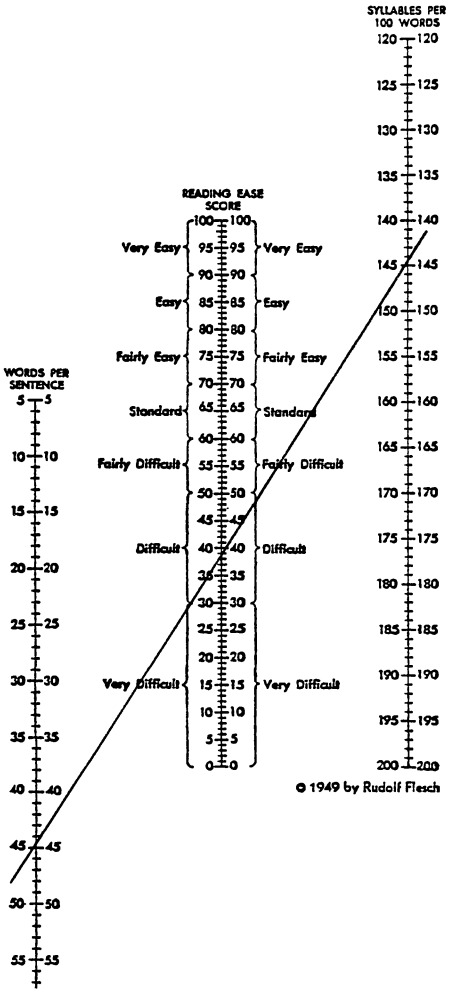

Figure 23. Flesch Readability Yardstick--Essays Composite

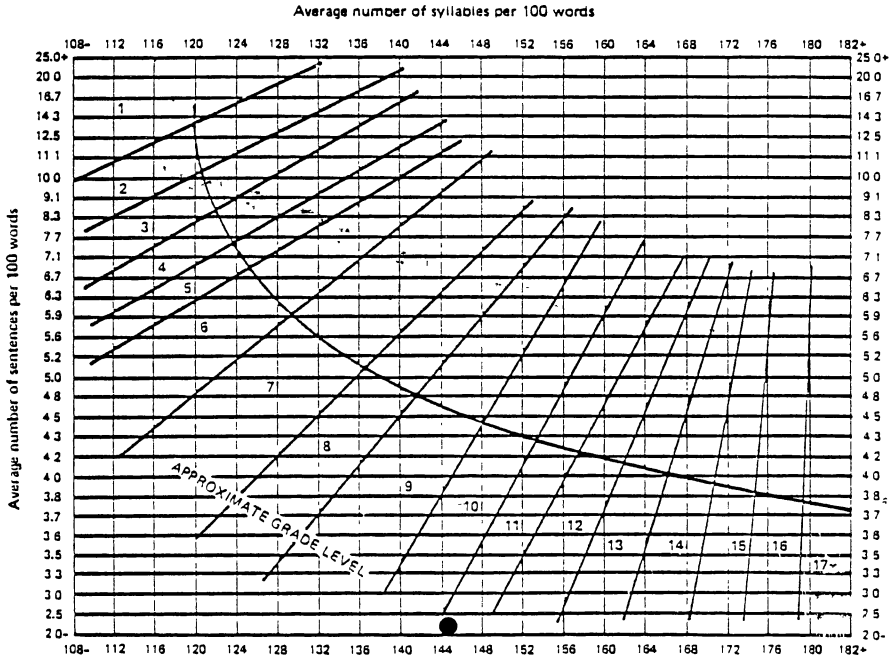

Figure 24. Fry Graph--Essays Composite

Comparison of Composite Scores

It is significant that the Dale-Chall formula gives a college ranking for Vanity and Scepsis but a high school ranking for Essays. Of all the formulas, the Dale-Chall is the one most calculated to recognize Glanvill's attempts to use simpler words. But because none of the formulas is calculated to measure brevity in any respect other than word length and sentence length, none of the formulas recognizes Glanvill's economy relative to his earlier writing. Instead, all the formulas penalize Glanvill for using his longest sentences yet--44.78 words per sentence, up from 37.73 words per sentence in Vanity and 38.03 words per sentence in Scepsis. Again, the trend is the same even

with updated punctuation. (See Appendix G for composite scores based upon modernized punctuation.) Table XXVII below and Table XXVIII on the following page summarize and compare the composite scores for both language elements and reading grade levels in Vanity, Scepsis, and Essays.

TABLE XXVII

COMPARISON OF COMPOSITE SCORES: LANGUAGE ELEMENTS

Language Variable	Vanity	Scepsis	Essays
Words	2528.00	2361.00	1433.00
Syllables	3724.00	3509.00	3077.00
Syllables per word	1.47	1.49	1.45
Three-syllable words	326.00	321.00	155.00
Syllables per 100 words	147.30	148.60	144.92
Sentences	67.00	62.00	32.00
Sentences per 100 words	2.65	2.63	2.23
Words per sentence	37.73	38.03	44.78

TABLE XXVIII

COMPARISON OF COMPOSITE SCORES: READING GRADE LEVELS

Readability Formula	Vanity	Scepsis	Essays
Gunning Fog	20.25	20.67	22.24
Devereaux/ARI	19.03	19.40	22.21
Flesch-Kincaid	16.51	16.80	18.97
Flesch	13-16	13-16	13-16
Dale-Chall	College	College	11-12
Fry	11	11	11
Coleman	10.37	10.62	10.06
Holmquist	7.95	7.97	7.88
Powers	7.43	7.52	7.87

CHAPTER VII

CONCLUSIONS

Evaluation of the Readability Comparisons

It is unfortunate that the readability formulas cannot measure Glanvill's attempts at brevity. Most of the formulas measure word difficulty and sentence difficulty (based on number of syllables and number of words, respectively) as the variables for assessing readability. Most formulas reward short sentences (for instance, not more than 19 words each on the Flesch scale) and short words (not more than 1.50 syllables per word, according to Flesch). Rudolf Flesch (21, p. 222) points out that in his formula sentence length is given the heaviest weight, and because sentence length is the easiest to measure of all variables, it is often overemphasized.

Although short sentences are usually more readable, not all long sentences are equally difficult to read, and even short sentences without subordination or some means of interrelating ideas can be difficult to understand. Glanvill's sentences, for example, ponderous as they are, do not seem as long as they in fact are, for his liberal use of colons and semicolons gives the reader a sense of completeness and finality between independent clauses--but the readability formulas cannot give Glanvill credit for that; instead they must penalize him for his lengthy sentences.

Moreover, the formulas cannot measure Glanvill's sentence length relative to his own age. In 1673 Newton's works published in the Royal Society's Philosophical Transactions averaged 32.13 words per sentence, which was considered short for that time. Dryden's sentences, for instance, averaged over 45 words each (34, p. 1056), and it is not difficult to find extremely long sentences among the works of Burton, Browne, Fuller, Bunyan, and other seventeenth-century prose writers. Of course modern readability formulas should not be criticized for not measuring 300-year old prose relative to seventeenth-century standards; nor should Glanvill be censured for not meeting twentieth-century standards. For that matter, despite his massive sentences, Glanvill's works score at about the same level (college, college graduate) with readability formulas as do today's scientific journals.

As Herman Weisman (66, p. 38) points out, a high or low readability score "does not necessarily mean that anything is wrong." And George Klare (41, p. 65), a widely recognized consultant in readability and bibliographer of readability studies, is quick to point out that readability formulas "are not perfect predictors" of reading ease or difficulty. Klare (43, p. 1) defines readable writing as writing that readers can read quickly, understand clearly, and accept readily (i.e., persevere in reading). According to this definition, Glanvill's writing is far more readable in Essays on Several Important Subjects in Philosophy and Religion than in The Vanity of Dogmatizing.

Clearly, readability formulas must be used with discrimination, and in many respects they are unworkable for anything other than modern writing. Glanvill's punctuation, strange by today's norms, should not be overlooked; nor can his obvious attempts to achieve brevity and

simplicity be discounted. Such changes as his substitution of "bird" and "plants" for "oviparous production" and "plantal germinations" are evidence that Glanvill's aim was simplicity and the rejection of "all the amplifications, digressions, and swellings of style." In the words of Edward Fry (23, p. 513), the man who developed one of the most widely-used readability formulas, "Perhaps simplicity may best be measured in printed pages." In that respect, Glanvill's style underwent tremendous changes during his tenure as a Fellow in the Royal Society; cutting as many as 100 words at a time, Glanvill trimmed 217 pages from his first publication. Of course some ideas were totally omitted as he changed forms, from book to essay. But the changes ran deeper as Glanvill changed expressions, deflating verbosities and superfluities in order to perfect the plain style advocated by the Royal Society.

The Royal Society's Lasting Influence

As Ian Gordon says, the influence of the seventeenth-century movement toward plain style is still felt today. Plainness is still the ideal of scientific communication, and technical writing textbooks still call for concise, direct prose which represents ideas in the fewest possible words (66, p. 28; 50, p. 7). Even the United States Government today calls for plain language, as indicated by Former President Carter's Executive Order 12044 calling for "simple and clear" regulations and HR6410, a bill passed under the Reagan Administration calling for revisions toward the plain style in the writing of the federal government and agencies that deal with it.

Thus, the transition in Glanvill's style may be seen as representative of the general movement toward the new plain style advocated by the Royal Society. Utilitarianism and the new scientific attitude were embodied in the Society, which Robert Adolph (1, p. 91) calls the "most tangible manifestation of science in England." The Society thereby headed the list of complex cultural forces that had a great impact on the prose style of Joseph Glanvill. In the words of George Philip Krapp (53, p. 545), the

> distrust of fine writing in English prose has not grown weaker with the passing of time. Prose has been, as Bacon would have it be, the servant of mankind, not merely an ornament of his state or a solace for his idler moments.

Especially in scientific and technical communication, the influence of the Royal Society has been a lasting influence.

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APPENDIX A

SEVENTEENTH-CENTURY PROSE SENTENCES: SELECTED SAMPLES

Others again, in that opposite extreme, do as great harm by their too much remissness; they give them no bringing up, no calling to busy themselves about, or to live in, teach them no trade, or set them in any good course; by means of which their servants, children, scholars, are carried away with that stream of drunkenness, idleness, gaming, and many such irregular courses, that in the end they rue it, curse their parents, and mischief themselves.

Robert Burton (11, p. 385)
78 Words

But even in times of subjection and hottest use, they conformed not unto the Romane practice of burning; whereby the Prophecy was secured concerning the body of Christ, that it should not see corruption, or a bone should not be broken; which we beleeve was also providentially prevented, from the Souldiers spear and nails that past by the little bones both in his hands and feet: Nor of ordinary contrivance, that it should not corrupt on the Crosse, according to the Laws of Romane Crucifixion, or an hair of his head perish, though observable in Jewish customes, to cut the hairs of Malefactors.

Sir Thomas Browne (7, p. 123)
103 Words

Indeed it was true of him, what was said of Cato Uticensis: That he seemed to be born to that onely which he went about: So dexterous was he in all his undertakings, In Court, in Camp, by Sea, by Land, with Sword, with Pen, witnesse in the last his History of the World; wherein the onely default or (defect rather) that it wanteth one half thereof.

Thomas Fuller (30, p. 133)
67 Words

But about ten or eleven a Clock one day, as I was walking under a Hedge, full of sorrow and guilt God knows, and bemoaning my self for this hard hap, that such a thought should arise within me, suddenly this sentence bolted in upon me, The Blood of Christ remits all guilt; at this I made a stand in my spirit: with that, this word took hold upon me, The Blood of Jesus Christ his Son cleanseth us from all sin: now I began to conceive peace in my Soul, and methought I saw as if the Tempter did hear and steal away from me, as being ashamed of what he had done.

John Bunyan (10, p. 39)
114 Words

I deny not what you urge of arts and sciences, that they have flourished in some ages more than others; but your instance in philosophy makes for me: for if natural causes be more known now than in the time of Aristotle, because more studied, it follows that poesy and other arts may, with the same pains, arrive still nearer to perfection; and, that granted, it will rest for you to prove that they wrought more perfect images of human life than we; which seeing in your discourse you have avoided to make good, it shall now be my task to show you some part of their defects, and some few excellencies of the Moderns.

John Dryden (22, p. 44)
115 Words

APPENDIX B

TEXT: READABILITY TEST I

Vanity of Dogmatizing, pp. 32-39

The memory is a faculty whose nature is as obscure, and has as much of riddle in it as any of the former; it seems to be an organical power, because bodily distempers often mar its ideas, and cause a total oblivion: but what instruments the soul uses in her review of past impressions, is a question which may drive inquiry to despair. There are four principal hypotheses by which a resolution has been attempted. The first that I'll mention, is that of the incomparable Descartes, who gives this account: The glandula pinealis, by him made the seat of common sense, does by its motion impel the spirits into divers parts of the brain; till it find those wherein are some tracks of the object we would remember; which consists in this, viz. that the pores of the brain, through the which the spirits before took their course, are more easily opened to the spirits which demand re-entrance; so that finding those pores, they make their way through them sooner than through others; whence there arises a special motion in the glandula, which signifies this to be the object we would remember. A second is, that of the ingenious Sir K. Digby, a summary of which is, that things are reserved in the memory by some corporeal exuvia and material images; which having impinged on the common sense, rebound thence into some vacant cells of the brain, where they keep their ranks and postures in the same order that they entered, till they are again stirred up; and then they slide through the fancy, as when they were first presented. These are the endeavors of those two grand sages, than whom it may be the sun never saw a more learned pair. And yet as a fad evidence of the infirmities of lapsed humanity: these great Sophi fail here of their wonted success in unriddling nature. And I think favor itself

can say no more of either hypothesis, than that they are ingenious attempts. Nor do I speak this to derogate from the grandeur of their wits used to victory: I should rather confer what I could to the erecting of such trophies to them, as might eternize their memories. And their coming short here, I think not to be from defect of their personal abilities, but specific constitution; and the doubt they leave us in, proceeds from hence, that they were no more than men. I shall consider what is mentioned from them apart, before I come to the other two: and what I am here about to produce, is not to argue either of these positions of falseness; but of unconceivableness. In the general, what has been urged under the former head, stands in full force against both these, and them that follow. But to the first; if memory be made by the easy motion of the spirits through the opened passages, according to what has been noted from Descartes; whence we have a distinct remembrance of such diversity of objects, whose images without doubt pass through the same apertures? And how should we recall the distances of bodies which lie in a line? Or, is it not likely, that the impelled spirits might light upon other pores accommodated to their purpose through the motion of other bodies through them? Yes, in such a pervious substance as the brain, they might find an easy either entrance, or exit, almost everywhere; and therefore to shake every grain of corn through the same holes of a sieve in repeated winnowings, is as easy to be performed as this to be conceived. Besides, it's difficult to apprehend, but that these avenues should in a very short time be stopped up by the pressure of other parts of the matter, through its natural gravity, or other alterations made in the brain: and the opening of other vicine

passages might quickly obliterate any tracks of these: as the making of one hole in the yielding mud, defaces the print of another near it; at least the accession of enlargement, which was derived from such transitions, would be as soon lost, as made. But for the second, how is it imaginable, that those active particles, which have no cement to unite them, nothing to keep them in the order they were set, yes, which are ever and anon jostled by the occursion of other bodies, whereof there is an infinite store in this repository, should so orderly keep their cells without any alteration of their site or posture, which at first was allotted them? And how is it conceivable, but that carelessly turning over the ideas of our mind to recover something we would remember, we should put all the other images into a disorderly floating, and so raise a little chaos of confusion, where nature requires the exactest order. According to this account, I cannot see, but that our memories would be more confused than our midnight compositions: for is it likely, that the divided atoms which presented themselves together, should keep the same ranks in such a variety of tumultuary agitations, as happen in that liquid medium? An heap of ants on an hillock, will more easily be kept to an uniformity in motion; and the little bodies which are incessantly playing up and down the air in their careless postures, are as capable of regularity as these. Much more might be added, but I intend only a touch.

But a third way, that has been attempted, is that of Aristotle, which says, that objects are conserved in the memory by certain intentional species, beings, which have nothing of matter in their essential constitution, but yet have a necessary subjective dependence on it, whence they are called material. To this briefly.

Besides that these species are made a medium between body and spirit, and therefore partake of no more of being, than what the charity of our imaginations affords them; and that the supposition infers a creative energy in the object their producent, which philosophy allows not to creature-efficients: I say, beside these, it is quite against their nature to subsist, but in the presence and under the actual influence of their cause; as being produced by an Emanative Causality, the effects whereof die in the removal of their origin. But this superannuated conceit deserves no more of our remembrance, than it contributes to the apprehension of it. And therefore I pass on to the last.

Which is that of Mr. Hobbs, that memory is nothing else but the knowledge of decaying sense, which is made by the reaction of one body against another; or, as he expresses it in his Humane Nature, a mixing of parts in an object. The foundation of this principle [as of many of its fellows] is totally eversed by the most ingenious commentator upon immaterial beings, Dr. H. More in his book Of Immortality. I shall therefore leave that cause in the hands of that most learned undertaker, and only observe two things to my present purpose. Neither the brain, nor spirits, nor any other material substance within the head can for any considerable space of time conserve motion. The former is of such a clammy consistence, that it can no more retain it than a quagmire: and the spirits for their liquidity are more incapable than the fluid medium, which is the conveyor of sounds, to persevere in the continued repetition of vocal airs. And if there were any other substance within us, as fitly tempered to preserve motion, as the author of the opinion could desire: yet which will equally press

against either of the former, this motion would be quickly deadened even to an utter cessation, by counter-motions; and we should not remember anything, but till the next impression. Much less can this principle give an account, how such an abundance of motions should orderly succeed one another, as things do in our memories: and to remember a song or tune, it will be required, that our souls be an harmony more than in a metaphor, continually running over in a silent whisper those musical accents which our retentive faculty is preserver of. Which could we suppose in a single instance; yet a multitude of musical consonancies would be as impossible, as to play a thousand tunes on a lute at once. One motion would cross and destroy another; all would be clashing and discord: and the musician's soul would be the most disharmonious: for according to the tenor of this opinion, our memories will be stored with infinite variety of divers, yes contrary motions, which must needs interfere, thwart, and obstruct on another; and there would be nothing within us, but ataxy and disorder.

Scepsis Scientifica, pp. 24-29

The memory also is a faculty whose nature is as obscure, and has as much of riddle in it as any of the former: it seems to be an organical power, because bodily distempers often mar its ideas, and cause a total oblivion: but what instruments the soul uses in her review of past impressions, is a question which may drive inquiry to despair. There are four principal hypotheses by which a resolution has been attempted.

The Peripatetick, the Cartesian, the Digbean, and the Hobbian. We'll examine these accounts of the magnale. And I begin with that which will needs have itself believed the most venerable for antiquity and worth.

Then according to Aristotle and his Peripatum, objects are conserved in the memory by certain intentional species, beings, which have nothing of matter in their essential constitution, but yet have a necessary subjective dependence on it, whence they are called material. To this briefly.

Besides that these species are made a medium between body and spirit, and therefore partake of no more of being, than what the charity of our imaginations affords them; and that the supposition infers a creative energy in the object their producent, which philosophy allows not to creature-efficients: I say, beside these, it is quite against their nature to subsist, but in the presence and under the actual influence of their cause; as being produced by an Emanative Causality, the effects whereof die in the removal of their origin. But this superannuated conceit deserves no more of our remembrance, than it

contributes to the apprehension of it. And therefore I pass on to the Cartesian which speaks thus:

The glandual pinealis, in this philosophy made the seat of common sense, does by its motion impel the spirits into divers parts of the brain; till it find those wherein are some tracks of the object we would remember; which consists in this, viz. that the pores of the brain, through the which the spirits before took their course, are more easily opened to the spirits which demand re-entrance; so that finding those pores, they make their way through them sooner than through others: whence there arises a special motion in the glandual, which signifies this to be the object we would remember.

But I fear there is no security neither in this hypothesis. For if memory be made by the easy motion of the spirits through the opened passages, according to what has been noted from Descartes; whence have we a distinct remembrance of such diversity of objects, whose images without doubt pass through the same apertures? And how should we recall the distances of bodies which lie in a line? Or, is it not likely, that the impelled spirits might light upon other pores accommodated to their purpose, the motion of other bodies through them? Yes, in such a pervious substance as the brain, they might find an easy either entrance, or exit, almost everywhere; and therefore to shake very grain of corn through the same holes of a sieve in repeated winnowings, as is easy to be performed, as this to be perceived. Besides, it's difficult to apprehend, but that these avenues should in a short time be stopped up by the pressure of other parts of the matter, through its natural gravity, or other alterations made in the brain: and the opening of other vicine passages might quickly

obliterate any tracks of these; as the making of one hole in the yielding mud, defaces the print of another near it; at least the accession of enlargement, which was derived from such transitions, would be as soon lost, as made.

We are still to seek then for an Oedipus for the riddle; wherefore we turn our eyes to the Digbean account, of which this is the sum; that things are reserved in the memory by some corporeal exuvie and material images; which having impinged on the common sense, rebound thence into some vacant cells of the brain, where they keep their ranks and postures in the same order that they entered, till they are again stirred up; and then they slide through the fancy, as when they were first presented.

But, how is it imaginable, that those active particles, which have no cement to unite them, nothing to keep them in the order they were set, yes, which are ever and anon jostled by the occursion of other bodies, whereof there is an infinite store in this repository, should so orderly keep their cells without any alteration of their site or posture, which at first was allotted them? And how is it conceivable, but that carelessly turning over the ideas of our mind to recover something we would remember, we should put all the other images into a disorderly floating, and so raise a little chaos of confusion, where nature requires the exactest order. According to this account, I cannot see, but that our memories would be more confused than our midnight compositions: for is it likely, that the divided atoms which presented themselves together, should keep the same ranks in such a variety of tumultuary agitations, as happen in that liquid medium? An heap of ants on an hillock will more easily be kept to an uniformity in

motion; and the little bodies which are incessantly playing up and down the air in their careless postures, are as capable of regularity as these.

The last account of the faculty we are inquiring of is the Hobbian, according to which hypothesis; memory is nothing else but the knowledge of decaying sense, made by the reaction of one body against another; or, as the author expresses it in his Humane Nature, a missing of parts in an object. The foundation of which principle (as of many of its fellows) is totally eversed by the most ingenious commentator upon immaterial beings, Dr. H. More in his book Of Immortality. I shall therefore leave that cause in the hands of that most learned undertaker, and only observe two things to my present purpose. Neither the brain, nor spirits, nor any other material substance within the head can for any considerable space of time conserve motion. The former is of such a clammy consistence, that it can no more retain it than a quagmire: and the spirits for their liquidity are more incapable than the fluid medium, which is the conveyor of sounds, and persevere in the continued repetition of vocal airs. And if there were any other substance within us, as fitly tempered to preserve motion, as the author of the opinion could desire: yet which will equally press against either of the former, this motion would be quickly deadened by counter motions; and we should not remember anything, but till the next impression. Much less can this principle give an account, how such an abundance of motions should orderly succeed one another, as things do in our memories: and to remember a song or tune, it will be required, that our soles be an harmony more than in a metaphor, continually running over in a silent whisper those musical accents which our

retentive faculty is preserver of. Which could we suppose in a single instance; yet a multitude of musical consonancies would be as impossible, as to play a thousand tunes on a lute at once. One motion would cross and destroy another; all would be clashing and discord: and the musician's soul would be the most disharmonious: for, according to the tenor of this opinion, our memories will be stored with infinite variety of divers, yes contrary motions, which must needs interfere, thwart, and obstruct one another: and there would be nothing within us, but ataxy and disorder.

Essays, pp. 7-9

The memory is a faculty in us as obscure, and perhaps as unaccountable as anything in nature. It seems to be an organical power, because diseases do often blot out its ideas, and cause oblivion: but what the marks and impressions are by which the soul remembers, is a question that has not yet been very well resolved. There are four principal hypotheses by which an account has been attempted; the Peripatetick, the Cartesian, the Digbean, and the Hobbian.

According to the Peripatetick Schools, objects are conserved in the memory by certain intentional species (as they call them) a sort of beings, that have a necessary dependence upon their subjects; but are not material in their formal constitution and nature. I need not say much against these arbitrary precautious creatures, that have no foundation in any of our faculties: or be that how it will, they are utterly unintelligible; neither bodily, nor spiritual; neither produced out of anything as the matters of their production; nor out of nothing, which were creation, and not to be allowed to be in the power of every, or any finite being. And though there were no such contradictions contrivance in the framing these species, yet they could not serve any purpose, as to the memory, since 'tis against the nature of emanative effects, such as these are, to subsist but by the continual influence of their causes; and so, if this were the true solution, we could remember nothing longer than the object was in presence.

The account of Descartes is to this purpose; the spirits are sent about the brain, to find the tracks of the objects we would call to mind; which tracks consist in this, viz., that the pores through which

the spirits that came from the objects past, are more easily opened, and afford a more ready passage to those others that seek to enter; whence arises a special motion in the glandule, which signifies this to be that we would remember.

But if our remembrance arise from the easy motion of the spirits through the opened passages (according to this hypothesis); how then do we so distinctly remember such a variety of objects, whose images pass the same way? And how the distances of bodies that lie in a line? Why should not the impelled spirits find other open passages, besides those made by the thing we would remember? When there are such continual motions through the brain from numerous other objects? Yes, in such a pervious substance as that is, why should not those subtle bodies meet, everywhere in an easy passage? It seems to me that one might conceive as well, how every grain of corn in a sieve should be often shaken through the same holes, as how the spirits in the repeated acts of memory should still go through the same pores: nor can I well apprehend but that those supposed opened passages, would in a short time be stopped up, either by the natural gravity of the parts, or the making new ones near those; or other alterations in the brain.

The hypothesis of Sir Kenelm Digby, is next, viz. that things are preserved in the memory by material images that flow from them, which having impinged on the common sense, rebound thence into some vacant cells of the brain, where they keep their ranks, and postures, as they entered, till again they are stirred, and then they appear to the fancy as they were first presented.

But how is it conceivable, that those active particles which have nothing to unite them, or to keep them in any order, yes which are

continually jostled by the occursion of other minute bodies, (of which there must needs be great store in this repository) should so long remain in the same state and posture? And how is it that when we turn over those ideas that are in our memory, to look for anything we would call to mind, we do not put all the images into a disorderly floating, and so make a chaos of confusion there, where the exactest order is required: and indeed according to this account, I cannot see but that our memories would be more confused than our dreams: and I can as easily conceive how an heap of ants can be kept to regular and uniform motions. Mr. Hobbs attempts another way; there is nothing in us, according to this philosopher, but matter and motion: all sense is reaction in matter the decay of that motion, and reaction, is imagination; and memory is the same thing, expressing that decay. So that according to M. H. all our perceptions are motions, and so is memory: concerning which, I observe but two things;

Neither the brain, nor spirits, nor any other material substance within the head, can for any considerable time conserve motion. The brain is such a clammy consistence, that it can no more retain it than a quagmire; the spirits are more liquid than the air, which receives every motion, and loses it as soon: and if there were any other corporeal part in us, as fitly tempered to keep motion as could be wished; yet the motions made in it would be quickly deadened by counter-motions, and so we should never remember anything, longer than till the next impression: and it is utterly impossible that so many motions should orderly succeed one another, as things do in our memories; but confusion and discord.

Upon the whole we see, that this seemingly plain faculty, the memory, is a riddle also which we have not yet found the way to resolve.

APPENDIX C

TEXT: READABILITY TEST II

Vanity of Dogmatizing, pp. 117-21

Again we owe much of our error and intellectual scarcity to the interest in, and power which our affections have over, our so easily seducible understandings. And 'tis a truth well worthy the pen, from which it dropped; Periit Judicium, ubi res transiit in Affectum. That Jove himself cannot be wife and in love; may be understood in a larger sense, than antiquity meant it. Affection bribes the judgment to the most notorious inequality; and we cannot expect an equitable award, where the judge is made a party: so that, that understanding only is capable of giving a just decision, which is, as Aristotle says of the law, Νοῦς ἄνεν ὀρεξεως: but where the will, or passion has the casting voice, the case of truth is desperate. And yet this is the miserable disorder, into which we are lapsed: the lower powers are gotten uppermost; and we see like men on our heads, as Plato observed of old, that on the right hand, which indeed is on the left. The woman in us, still prosecutes a deceit, like that begun in the Garden: and our understandings are wedded to an Eve, as fatal as the mother of our miseries. And while all things are judged according to their suitableness, or disagreement to the gusto of the fond feminine; we shall be as far from the Tree of Knowledge, as from that, which is guarded by the cherubin. The deceiver soon found this soft place of Adam's: and innonceny itself did not secure him from this way of seduction. The first deception entered in at this postern, and has ever since kept it open for the entry of legion: so that we scarce see anything now but through our passions, the most blind, and sophisticate things about us. Thus the monsters which story relates to have their eyes in their breasts, are pictures of us in our invisible selves. Our

love of one opinion induces us to embrace it; and our hate of another, does more than fit us, for its rejection: and that love is blind, is extensible beyond the object of poetry. When once the affections are engaged, there's but a short step to the understanding: and, Facile credimus quod volumus, is a truth, that needs not plead authority to credit it.

The reason, I conceive, is this: love as it were uniting the object to the soul, gives it a kind of identity with us; so that the beloved idea is but our selves in another name: and when self is at the bar, the sentence is not like to be impartial: for every man is naturally a Narcissus, and each passion in us, no other but self-love sweetened by milder epithets. We can love nothing, but what is agreeable to us; and our desire of what is so, has its first inducement from within us: yes, we love nothing but what has some resemblance within our selves; and whatever we applaud as good or excellent, is but self in a transcript, and e contra. Thus, to reach the highest of our amours, and to speak all at once: we love our friends, because they are our image; and we love our God, because we are his. So then, the beloved opinion being thus wedded to the intellect; the case of our espoused self becomes our own: and when we weigh our selves, justice does not use to hold the balance. Besides, all things being double-handed, and having the appearances both of truth, and falsehood; where our affections have engaged us, we attend only to the former, which we see through a magnifying medium: while looking on the latter, through the wrong end of the perspective, which scants their dimensions, we neglect and contemn them. Yes, and as in corrupt judicial proceedings, the fore-stalled understanding passes a

preemptory sentence upon the single hearing of one party; and so comes under the poet's censure of him, Qui statuit aliquid parte inaudita altera.

Scepsis Scientifica, pp. 86-88

Again we owe much of our error and intellectual scarcity to the interest in, and power which our affections have over our so easy seducible understandings. And 'tis a truth well worthy the pen, from which it dropped; Periit Judicium, ubi res transiit in Affectum. That Jove himself cannot be wife and in love, may be understood in a larger sense, than antiquity meant it. Affection bribes the judgment to the most notorious inequality; and we cannot expect an equitable award, where the judge is made a party: so that, that understanding only is capable of giving a just decision, which is, as Aristotle says of the law, Nous ἄνευ ὀρέξεως: but where the will, or passion has the casting voice, the case of truth is desperate. And yet this is the miserable disorder, into which we are lapsed: the lower powers are gotten uppermost; and we see like men on our heads, as Plato observed of old, that on the right hand, which indeed is on the left. The woman in us, still prosecutes a deceit, like that begun in the Garden: and our understandings are wedded to an Eve, as fatal as the mother of our miseries. And while all things are judged according to their suitableness, or disagreement to the gusto of the fond feminine; we shall be as far from the Tree of Knowledge, as from that, which is guarded by the cherubin. The deceiver soon found this soft place of Adam's; and innonceny itself did not secure him from this way of seduction. The first deception entered in at this postern, and has ever since kept it open for the entry of legion: so that we scarce see anything now but through our passions, the most blind, and sophisticate things about us. The monsters which story relates to have their eyes in their breasts, are pictures of us in our invisible selves. Our love

of one opinion induces us to embrace it; and our hate of another, does more than fit us, for its rejection: and, that love is blind, is extensible beyond the object of poetry. When once the affections are engaged, there's but a short step to the understanding: and, Facile credimus quod volumus, is a truth, that needs not plead authority to credit it.

The reason, I conceive, is this: love as it were uniting the object to the soul, gives it a kind of identity with us; so that the beloved idea is but our selves in another name: and when self is at the bar, the sentence is not like to be impartial: for every man is naturally a Narcissus, and each passion in us, no other but self-love sweetened by milder epithets. We can love nothing, but what we find agreeable to our selves; and our desire of what is so, has its first inducement from within us: yes, we love nothing but what resembles us; and whatever we applaud as good or excellent, is but self in a transcript, and e contra. Thus, to reach the highest of our amours, and to speak all at once: we love our friends, because they are our image; and we love our God, because we are His. So then, the beloved opinion being thus wedded to the intellect; the case of our espoused self becomes our own: and when we weigh ourselves, justice does not use to hold the balance.

Besides, all things being double-handed, and having the appearances both of truth, and falsehood; where our affections have engaged us, we attend only to the former, which we see through a magnifying medium: while looking on the latter, through the wrong end of the perspective, which scants their dimensions, we neglect and contemn them. Yes, and as in corrupt judicial proceedings, the

fore-stalled understanding passes a preemptory sentence upon the single hearing of one party; and so though it may chance to be right in the conclusion; is yet unjust and mistake in the method of inference.

Essays, pp. 22-23

I come now, to consider the evil influence our affections have over our understandings, by which they are great reasons of our ignorance, and mistakes. Periit Judicium ubi res transiit in affectum. That Jupiter himself cannot be wife, and in love, was a saying of the ancients, and may be understood in a larger sense than they meant. That understanding only is capable of passing a just sentence, that is, as Aristotle says of the law, Νῶς ἄνευ ὀρέξεως; but where the will and passions have the casting voice, the cause of truth is desperate. Now this is the present unhappy state of man; our lower powers are gotten uppermost, and we see like men on their heads, as Plato observed of old, that on the right hand, which indeed is on the left. The woman in us still prosecutes a deceipt like that begun in the Garden; and we are wedded to an Eve, as fatal as the mother of our miseries. The Deceiver soon found this soft place in Adam, and innoncency itself did not secure him from this way of seduction: We now scarce see anything but through our passions, that are wholly blind, and incapable: so that the monsters that story relates to have their eyes in their breasts, are pictures of us in our invisible selves.

And now, all things being double-handed, and having appearances both of truth, and falsehood, the engaged affection magnifies the shows of truth, and makes the beloved opinion appear as certain; while the considerations on the other side being lessened and neglected, seem as nothing, though they are never so weighty and considerable.

APPENDIX D

TEXT: READABILITY TEST III

Vanity of Dogmatizing, pp. 210-12

We cannot know anything of nature but by an analysis of it to its true initial causes: and till we know the first springs of natural motions, we are still but ignorants. These are the alphabet of science, and nature cannot be read without them. Now who dares pretend to have seen the prime motive causes, or to have had a view of nature, while she lay in her simple originals? We know nothing but effects, and those but by our senses. Nor can we judge of their causes, but by proportion to palpable causalities conceiving them like those within the sensible horizon. Now 'tis no doubt with the considerate, but that the rudiments of nature are very unlike the grosser appearances. Thus in things obvious, there's but little resemblance between the mucous sperm, and the completed animal. The egg is not like the oviparous production: nor the corrupted muck like the creature that creeps from it. There's but little similitude betwixt a terreous humidity, and plantal germinations; nor do vegetable derivations ordinarily resemble their simple feminalities. So then, since there's so much dissimilitude between cause and effect in the more palpable phenomena, we can expect no less between them, and their invisible efficients. Now had our senses never presented us with those obvious seminal principles of apparent generations, we should never have suspected that a plant or animal could have proceeded from such unlikely materials: much less, can we conceive or determine the uncompounded initials of natural productions, in the total silence of our senses. And though the Grand Secretary of Nature, the miraculous Descartes have here infinitely out-done all the philosophers went before him, in giving a particular and analytical account of the universal fabric: yet he

intends his principles but for hypotheses, and never pretends that things are really or necessarily, as he has supposed them; but that they may be admitted pertinently to solve the phenomena, and are convenient supposals for the use of life. Nor can any further account be expected from humanity, but how things possibly may have been made consonantly to sensible nature: but infallibly to determine, how they truly were effected, is proper to him only that saw them in the chaos, and fashioned them out of that confused mass. For to say, the principles of nature must needs be such as our philosophy makes them, is to set bounds to ominpotence, and to confine infinite power and wisdom to our shallow models.

Scepsis Scientifica, pp. 154-56

But we cannot know anything of nature but by an analysis of it to its true initial causes: and till we know the first springs of natural motions, we are still but ignorants. These are the alphabet of science, and nature cannot be read without them. Now who dares pretend to have seen the prime motive causes, or to have had a view of nature, while she lay in her simple originals? We know nothing but effects, and those but by our senses. Nor can we judge of their causes, but by proportion to palpable causalities conceiving them like those within the sensible horizon. Now 'tis no doubt with the considerate, but that the rudiments of nature are very unlike the grosser appearances. Thus in things obvious, there's but little resemblance between the mucous sperm, and the completed animal. The egg is not like the oviparous production: nor the corrupted muck like the creature that creeps from it. There's but little similitude betwixt a terreous humidity, and plantal germinations; nor do vegetable derivations ordinarily resemble their simple feminalities. So then, since there's so much dissimilitude between cause and effect in the more palpable phenomena, we can expect no less between them, and their invisible efficients. Now had our senses never presented us with those obvious seminal principles of apparent generations, we should never have suspected that a plant or animal could have proceeded from such unlikely materials: much less, can we conceive or determine the uncompounded initials of natural productions, in the total silence of our senses. And though the Grand Secretary of Nature, the miraculous Descartes have here infinitely out-done all the philosophers went before him, in giving a particular and analytical account of the universal fabric: yet he

intends his principles but for hypotheses, and never pretends that things are really or necessarily, as he has supposed them; but that they may be admitted pertinently to solve the phenomena, and are convenient supposals for the use of life. Nor can any further account be expected from humanity, but how things possibly may have been made consonantly to sensible nature: but infallibly to determine, how they truly were effected, is proper to him only that saw them in the chaos, and fashioned them out of that confused mass. For to say, the principles of nature must needs be such as our philosophy makes them, is to set bounds to ominpotence, and to confine infinite power and wisdom to our shallow models.

Essays, pp. 15-16

We cannot properly and perfectly know anything in nature without the knowledge of its first causes, and the springs of natural motions: and who has any pretense to this? Who can say he has seen nature in its beginnings? We know nothing but effects, nor can we judge at their immediate causes, but by proportion to the things that do appear; which no doubt are very unlike the rudiments of nature. We see there is no resemblance between the seed, and herb, and flower; between the sperm, and the animal; the egg, and the bird that is hatched of it; and since there is so much dissimilitude between cause and effect in these apparent things, we cannot think there is less between them and their first, and invisible efficients: now had not our senses assured us of it, we should never have suspected that plants, or animals did proceed from such unlikely originals; such causes, and we can conceive as little now of the nature and quality of the causes that are beyond the prospect of our senses: we may frame fancies and conjectures of them, but to say, that the principles of nature are just as our philosophy makes them, is to set bounds to omnipotence, and to circumscribe infinite power, and wisdom, by our narrow thoughts and opinions.

APPENDIX E

DALE LIST OF 3,000 FAMILIAR WORDS

a
able
aboard
about
above
absent
accept
accident
account
ache(ing)
acorn
acre
across
act(s)
add
address
admire
adventure
afar
afraid
after
afternoon
afterward(s)
again
against
age
aged
ago
agree
ah
ahead
aid
aim
air
airfield
airport
airplane
airship
airy
alarm
alike
alive
all
alley
alligator
allow
almost
alone
along
aloud
already
also
always
am
America
American
among
amount
an
and
angel
anger
angry
animal
another
answer
ant
any
anybody
anyhow
anyone
anything
anyway
anywhere
apart
apartment
ape
apiece
appear
apple
April
apron
are
aren't
arise
arithmetic
arm
armful
army
arose
around
arrange
arrive(d)
arrow
art
artist
as
ash(es)
aside
ask
asleep
at
ate
attack
attend
attention
August
aunt
author
auto
automobile
autumn
avenue
awake(n)
away
awful(ly)
awhile
ax
baa
babe
baby(ies)
back
background
backward(s)
bacon
bad(ly)
badge
bag
bake(r)
baking
bakery
ball
balloon
banana
band
bandage
bang
banjo
bank(er)
bar
barber
bare(ly)
barefoot
bark
barn
barrel
base
baseball
basement
basket
bat
batch
bath
bathe
bathing
bathroom
bathtub
battle
battleship
bay
be(ing)
beach

bead
beam
bean
bear
beard
beast
beat(ing)
beautiful
beautify
beauty
became
because
become
becoming
bed
bedbug
bedroom
bedspread
bedtime
bee
beech
beef
beefsteak
beehive
been
beer
beet
before
beg
began
beggar
begged
begin
beginning
begun
behave
behind
believe
bell
belong
below
belt
beneath
bench
bend
bent
berry(ies)
beside(s)
best
bet
better
between
bib
bible
bicycle
bid
big(ger)
bill
billboard
bin
bind
bird
birth
birthday
biscuit
bit
bite
biting
bitter
black
blackberry
blackbird
blackboard
blackness
blacksmith
blame
blank
blanket
blast
blaze
bleed
bless
blessing
blew
blind(s)
blindfold
block
blood
bloom
blossom
blot
blow
blue
blueberry
bluebird
bluejay
blush
board
boast
boat
bob
bobwhite
body(ies)
boil(er)
bold
bone
bonnet
boo
book
bookcase
bookkeeper
boom
boot
born
borrow
boss
both
bother
bottle
bottom
bought
bounce
bow
bowl
bow-wow
box(es)
boxcar
boxer
boy
boyhood
bracelet
brain
brake
bran
branch
brass
brave
bread
break
breakfast
breast
breath
breathe
breeze
brick
bride
bridge
bright
brightness
bring
broad
broadcast
broke(n)
brook
broom
brother
brought
brown
brush
bubble
bucket
buckle

bud
buffalo
bug
buggy
build
building
built
bulb
bull
bullet
bum
bumblebee
bump
bun
bunch
bundle
bunny
burn
burst
bury
bus
bush
bushel
business
busy
but
butcher
butt
butter
buttercup
butterfly
buttermilk
butterscotch
button
buttonhole
buy
buzz
by
bye
cab
cabbage
cabin
cabinet
cackle
cage
cake
calendar
calf
call(er)(ing)
came
camel
camp
campfire
can
canal
canary
candle
candlestick
candy
cane
cannon
cannot
canoe
can't
canyon
cap
cape
capital
captain
car
card
cardboard
care
careful
careless
carelessness
carload
carpenter
carpet
carriage
carrot
carry
cart
carve
case
cash
cashier
castle
cat
catbird
catch
catcher
caterpillar
catfish
catsup
cattle
caught
cause
cave
ceiling
cell
cellar
cent
center
cereal
certain(ly)
chain
chair
chalk
champion
chance
change
chap
charge
charm
chart
chase
chatter
cheap
cheat
check
checkers
cheek
cheer
cheese
cherry
chest
chew
chick
chicken
chief
child
childhood
children
chill(y)
chimney
chin
china
chip
chipmunk
chocolate
choice
choose
chop
chorus
chose(n)
christen
Christmas
church
churn
cigarette
circle
circus
citizen
city
clang
clap
class
classmate
classroom
claw
clay

clean(er)
clear
clerk
clever
click
cliff
climb
clip
cloak
clock
close
closet
cloth
clothes
clothing
cloud(y)
clover
clown
club
cluck
clump
coach
coal
coast
coat
cob
cobbler
cocoa
coconut
cocoon
cod
codfish
coffee
coffeepot
coin
cold
collar
college
color(ed)
colt
column
comb
come
comfort
comic
coming
company
compare
conductor
cone
connect
coo
cook(ed)
cook(ing)
cooky(ie)(s)
cool(er)
coop
copper
copy
cord
cork
corn
corner
correct
cost
cot
cottage
cotton
couch
cough
could
couldn't
count
counter
country
county
course
court
cousin
cover
cow
coward(ly)
cowboy
cozy
crab
crack
cracker
cradle
cramps
cranberry
crank(y)
crash
crawl
crazy
cream(y)
creek
creep
crept
cried
croak
crook(ed)
crop
cross(ing)
cross-eyed
crow
crowd(ed)
crown
cruel
crumb
crumble
crush
crust
cry(ies)
cub
cuff
cup
cupboard
cupful
cure
curl(y)
curtain
curve
cushion
custard
customer
cut
cute
cutting
dab
dad
daddy
daily
dairy
daisy
dam
damage
dame
damp
dance(r)
dancing
dandy
danger(ous)
dare
dark(ness)
darling
darn
dart
dash
date
daughter
dawn
day
daybreak
daytime
dead
deaf
deal
dear
death
December
decide
deck

deed
deep
deer
defeat
defend
defense
delight
den
dentist
depend
deposit
describe
desert
deserve
desire
desk
destroy
devil
dew
diamond
did
didn't
die(d)(s)
difference
different
dig
dim
dime
dine
ding-dong
dinner
dip
direct
direction
dirt(y)
discover
dish
dislike
dismiss
ditch
dive
diver
divide
do
dock
doctor
does
doesn't
dog
doll
dollar
dolly
done
donkey
don't
door
doorbell
doorknob
doorstep
dope
dot
double
dough
dove
down
downstairs
downtown
dozen
drag
drain
drank
draw(er)
draw(ing)
dream
dress
dresser
dressmaker
drew
dried
drift
drill
drink
drip
drive(n)
driver
drop
drove
drown
drowsy
drug
drum
drunk
dry
duck
due
dug
dull
dumb
dump
during
dust(y)
duty
dwarf
dwell
dwelt
dying
each
eager
eagle
ear
early
earn
earth
east(ern)
easy
eat(en)
edge
egg
eh
eight
eighteen
eighth
eighty
either
elbow
elder
eldest
electric
electricity
elephant
eleven
elf
elm
else
elsewhere
empty
end(ing)
enemy
engine
engineer
English
enjoy
enough
enter
envelope
equal
erase(r)
errand
escape
eve
even
evening
ever
every
everybody
everyday
everyone
everything
everywhere
evil
exact
except

exchange
excited
exciting
excuse
exit
expect
explain
extra
eye
eyebrow
fable
face
facing
fact
factory
fail
faint
fair
fairy
faith
fake
fall
false
family
fan
fancy
far
faraway
fare
farmer
farm(ing)
far-off
farther
fashion
fast
fasten
fat
father
fault
favor
favorite
fear
feast
feather
February
fed
feed
feel
feet
fell
fellow
felt
fence
fever
few
fib
fiddle
field
fife
fifteen
fifth
fifty
fig
fight
figure
file
fill
film
finally
find
fine
finger
finish
fire
firearm
firecracker
fireplace
fireworks
firing
first
fish
fisherman
fist
fit(s)
five
fix
flag
flake
flame
flap
flash
flashlight
flat
flea
flesh
flew
flies
flight
flip
flip-flop
float
flock
flood
floor
flop
flour
flow
flower(y)
flutter
fly
foam
fog
foggy
fold
folks
follow(ing)
fond
food
fool
foolish
foot
football
footprint
for
forehead
forest
forget
forgive
forgot(ten)
fork
form
fort
forth
fortune
forty
forward
fought
found
fountain
four
fourteen
fourth
fox
frame
free
freedom
freeze
freight
French
fresh
fret
Friday
fried
friend(ly)
friendship
frighten
frog
from
front
frost
frown
froze

fruit
fry
fudge
fuel
full(y)
fun
funny
fur
furniture
further
fuzzy
gain
gallon
gallop
game
gang
garage
garbage
garden
gas
gasoline
gate
gather
gave
gay
gear
geese
general
gentle
gentleman
gentlemen
geography
get
getting
giant
gift
gingerbread
girl
give(n)
giving
glad(ly)
glance
glass(es)
gleam
glide
glory
glove
glow
glue
go(ing)
goes
goal
goat
gobble
God(g)
godmother
gold(en)
goldfish
golf
gone
good(s)
good-by(bye)
good-looking
goodness
goody
goose
gooseberry
got
govern
government
gown
grab
gracious
grade
grain
grand
grandchild
grandchildren
granddaughter
grandfather
grandma
grandmother
grandpa
grandson
grandstand
grape(s)
grapefruit
grass
grasshopper
grateful
grave
gravel
graveyard
gravy
gray
graze
grease
great
green
greet
grew
grind
groan
grocery
ground
group
grove
grow
guard
guess
guest
guide
gulf
gum
gun
gunpowder
guy
ha
habit
had
hadn't
hail
hair
haircut
hairpin
half
hall
halt
ham
hammer
hand
handful
handkerchief
handle
handwriting
hang
happen
happily
happiness
happy
harbor
hard
hardly
hardship
hardware
hare
hark
has
harm
harness
harp
harvest
hasn't
haste(n)
hasty
hat
hatch
hatchet
hate
haul
have
haven't

having
hawk
hay
hayfield
haystack
he
head
headache
heal
health(y)
heap
hear(ing)
heard
heart
heat(er)
heaven
heavy
he'd
heel
height
held
hell
he'll
hello
helmet
help(er)
helpful
hem
hen
henhouse
her(s)
herd
here
here's
hero
herself
he's
hey
hickory
hid
hidden
hide
high
highway
hill
hillside
hilltop
hilly
him
himself
hind
hint
hip
hire
his
hiss
history
hit
hitch
hive
ho
hoe
hog
hold(er)
hole
holiday
hollow
holy
home
homely
homesick
honest
honey
honeybee
honeymoon
honk
honor
hood
hoof
hook
hoop
hop
hope(ful)
hopeless
horn
horse
horseback
horseshoe
horse
hospital
host
hot
hotel
hound
hour
house
housetop
housewife
housework
how
however
howl
hug
huge
hum
humble
hump
hundred
hung
hunger
hungry
hunk
hunt(er)
hurrah
hurried
hurry
hurt
husband
hush
hut
hymn
I
ice
icy
I'd
idea
ideal
if
ill
I'll
I'm
important
impossible
improve
in
inch(es)
income
indeed
Indian
indoors
ink
inn
insect
inside
instant
instead
insult
intend
interested
interesting
into
invite
iron
is
island
isn't
it
its
it's
itself
I've
ivory

ivy
jacket
jacks
jail
jam
January
jar
jaw
jay
jelly
jellyfish
jerk
jig
job
jockey
join
joke
joking
jolly
journey
joy(ful)
joyous
judge
jug
juice
juicy
July
jump
June
junior
junk
just
keen
keep
kept
kettle
key
kick
kid
kill(ed)
kind(ly)
kindness
king
kingdom
kiss
kitchen
kite
kitten
kitty
knee
kneel
knew
knife
knit
knives
knob
knock
knot
know
known
lace
lad
ladder
ladies
lady
laid
lake
lamb
lame
lamp
land
lane
language
lantern
lap
lard
large
lash
lass
last
late
laugh
laundry
law
lawn
lawyer
lay
lazy
lead
leader
leaf
leak
lean
leap
learn(ed)
least
leather
leave(ing)
led
left
leg
lemon
lemonade
lend
length
less
lesson
let
let's
letter
letting
lettuce
level
liberty
library
lice
lick
lid
lie
life
lift
light(ness)
lightning
like
likely
liking
lily
limb
lime
limp
line
linen
lion
lip
list
listen
lit
little
live(s)
lively
liver
living
lizard
load
loaf
loan
loaves
lock
locomotive
log
lone
lonely
lonesome
long
look
lookout
loop
loose
lord
lose(r)
loss
lost

lot
loud
love
lovely
lover
low
luck(y)
lumber
lump
lunch
lying
ma
machine
machinery
mad
made
magazine
magic
maid
mail
mailbox
mailman
major
make
making
male
mama
mamma
man
manager
mane
manger
many
map
maple
marble
march(M)
mare
mark
market
marriage
married
marry
mask
mast
master
mat
match
matter
mattress
may(M)
maybe
mayor
maypole

me
meadow
meal
mean(s)
meant
measure
meat
medicine
meet(ing)
melt
member
men
mend
meow
merry
mess
message
met
metal
mew
mice
middle
midnight
might(y)
mile
milk
milkman
mill
miller
million
mind
mine
miner
mint
minute
mirror
mischief
miss(M)
misspell
mistake
misty
mitt
mitten
mix
moment
Monday
money
monkey
month
moo
moon
moonlight
moose
mop

more
morning
morrow
moss
most(ly)
mother
motor
mount
mountain
mouse
mouth
move
movie
movies
moving
mow
Mr., Mrs.
much
mud
muddy
mug
mule
multiply
murder
music
must
my
myself
nail
name
nap
napkin
narrow
nasty
naughty
navy
near
nearby
nearly
neat
neck
necktie
need
needle
needn't
Negro
neighbor
neighborhood
neither
nerve
nest
net
never
nevermore

new
news
newspaper
next
nibble
nice
nickel
night
nightgown
nine
nineteen
ninety
no
nobody
nod
noise
noisy
none
noon
nor
north(ern)
nose
not
note
nothing
notice
November
now
nowhere
number
nurse
nut
oak
oar
oatmeal
oats
obey
ocean
o'clock
October
odd
of
off
offer
office
officer
often
oh
oil
old
old-fashioned
on
once
one
onion
only
onward
open
or
orange
orchard
order
ore
organ
other
otherwise
ouch
ought
our(s)
ourselves
out
outdoors
outfit
outlaw
outline
outside
outward
oven
over
overalls
overcoat
overeat
overhead
overhear
overnight
overturn
owe
owing
owl
own(er)
ox
pa
pace
pack
package
pad
page
paid
pail
pain(ful)
paint(er)
painting
pair
pal
palace
pale
pan
pancake
pane
pansy
pants
papa
paper
parade
pardon
parent
park
part(ly)
partner
party
pass
passenger
past
paste
pasture
pat
patch
path
patter
pave
pavement
paw
pay
payment
pea(s)
peace(ful)
peach(es)
peak
peanut
pear
pearl
peck
peek
peel
peep
peg
pen
pencil
penny
people
pepper
peppermint
perfume
perhaps
person
pet
phone
piano
pick
pickle
picnic
picture

pie
piece
pig
pigeon
piggy
pile
pill
pillow
pin
pine
pineapple
pink
pint
pipe
pistol
pit
pitch
pitcher
pity
place
plain
plan
plane
plant
plate
platform
platter
play(er)
playground
playhouse
playmate
plaything
pleasant
please
pleasure
plenty
plow
plug
plum
pocket
pocketbook
poem
point
poison
poke
pole
police
policeman
polish
polite
pond
ponies
pony
pool
poor
pop
popcorn
popped
porch
pork
possible
post
postage
postman
pot
potato(es)
pound
pour
powder
power(ful)
praise
pray
prayer
prepare
present
pretty
price
prick
prince
princess
print
prison
prize
promise
proper
protect
proud
prove
prune
public
puddle
puff
pull
pump
pumpkin
punch
punish
pup
pupil
puppy
pure
purple
purse
push
puss
pussy
pussycat
put
putting
puzzle
quack
quart
quarter
queen
queer
question
quick(ly)
quiet
quilt
quit
quite
rabbit
race
rack
radio
radish
rag
rail
railroad
railway
rain(y)
rainbow
raise
raisin
rake
ram
ran
ranch
rang
rap
rapidly
rat
rate
rather
rattle
raw
ray
reach
read
reader
reading
ready
real
really
reap
rear
reason
rebuild
receive
recess
record
red

redbird
redbreast
refuse
reindeer
rejoice
remain
remember
remind
remove
rent
repair
repay
repeat
report
rest
return
review
reward
rib
ribbon
rice
rich
rid
riddle
ride(r)
riding
right
rim
ring
rip
ripe
rise
rising
river
road
roadside
roar
roast
rob
robber
robe
robin
rock(y)
rocket
rode
roll
roller
roof
room
rooster
root
rope
rose
rosebud
rot
rotten
rough
round
route
row
rowboat
royal
rub
rubbed
rubber
rubbish
rug
rule(r)
rumble
run
rung
runner
running
rush
rust(y)
rye
sack
sad
saddle
sadness
safe
safety
said
sail
sailboat
sailor
saint
salad
sale
salt
same
sand(y)
sandwich
sang
sank
sap
sash
sat
satin
satisfactory
Saturday
sausage
savage
save
savings
saw
say
scab
scales
scare
scarf
school
schoolboy
schoolhouse
schoolmaster
schoolroom
scorch
score
scrap
scrape
scratch
scream
screen
screw
scrub
sea
seal
seam
search
season
seat
second
secret
see(ing)
seed
seek
seem
seen
seesaw
select
self
selfish
sell
send
sense
sent
sentence
separate
September
servant
serve
service
set
setting
settle
settlement
seven
seventeen
seventh
seventy
several
sew

shade
shadow
shady
shake(r)
shaking
shall
shame
shan't
shape
share
sharp
shave
she
she'd
she'll
she's
shear(s)
shed
sheep
sheet
shelf
shell
shepherd
shine
shining
shiny
ship
shirt
shock
shoe
shoemaker
shone
shook
shoot
shop
shopping
shore
short
shot
should
shoulder
shouldn't
shout
shovel
show
shower
shut
shy
sick(ness)
side
sidewalk
sideways
sigh
sight
sign
silence
silent
silk
sill
silly
silver
simple
sin
since
sing
singer
single
sink
sip
sir
sis
sissy
sister
sit
sitting
six
sixteen
sixth
sixty
size
skate
skater
ski
skin
skip
skirt
sky
slam
slap
slate
slave
sled
sleep(y)
sleeve
sleigh
slept
slice
slid
slide
sling
slip
slipper
slipped
slippery
slit
slow(ly)
sly
smack
small
smart
smell
smile
smoke
smooth
snail
snake
snap
snapping
sneeze
snow(y)
snowball
snowflake
snuff
snug
so
soak
soap
sob
sock
sod
soda
sofa
soft
soil
sold
soldier
sole
some
somebody
somehow
someone
something
sometime(s)
somewhere
son
song
soon
sore
sorrow
sorry
sort
soul
sound
soup
sour
south(ern)
space
spade
spank
sparrow
speak(er)
spear

speech
speed
spell(ing)
spend
spent
spider
spike
spill
spin
spinach
spirit
spit
splash
spoil
spoke
spook
spoon
sport
spot
spread
spring
springtime
sprinkle
square
squash
squeak
squeeze
squirrel
stable
stack
stage
stair
stall
stamp
stand
star
stare
start
starve
state
station
stay
steak
steal
steam
steamboat
steamer
steel
steep
steeple
steer
stem
step
stepping
stick(y)
stiff
still(ness)
sting
stir
stitch
stock
stocking
stole
stone
stood
stool
stoop
stop
stopped
stopping
store
stork
stories
storm(y)
story
stove
straight
strange(r)
strap
straw
strawberry
stream
street
stretch
string
strip
stripes
strong
stuck
study
stuff
stump
stung
subject
such
suck
sudden
suffer
sugar
suit
sum
summer
sun
Sunday
sunflower
sung
sunk
sunlight
sunny
sunrise
sunset
sunshine
supper
suppose
sure(ly)
surface
surprise
swallow
swam
swamp
swan
swat
sear
sweat
sweater
sweep
sweet(ness)
sweetheart
swell
swept
swift
swim
swimming
swing
switch
sword
swore
table
tablecloth
tablespoon
tablet
tack
tag
tail
tailor
take(n)
taking
tale
talk(er)
tall
tame
tan
tank
tap
tape
tar
tardy
task
taste
taught
tax
tea

teach(er)
team
tear
tease
teaspoon
teeth
telephone
tell
temper
ten
tennis
tent
term
terrible
test
than
tank(s)
thankful
Thanksgiving
that
that's
the
theater
thee
their
them
then
there
these
they
they'd
they'll
they're
they've
thick
thief
thimble
thin
thing
think
third
thirsty
thirteen
thirty
this
tho
thorn
those
though
thought
thousand
thread
three
threw
throat
throne
through
throw(n)
thumb
thunder
Thursday
thy
tick
ticket
tickle
tie
tiger
tight
till
time
tin
tinkle
tiny
tip
tiptoe
tire
tired
'tis
title
to
toad
toadstool
toast
tobacco
today
toe
together
toilet
told
tomato
tomorrow
ton
tone
tongue
tonight
too
took
tool
toot
tooth
toothbrush
toothpick
top
tore
torn
toss
touch
tow
toward(s)
towel
tower
town
toy
trace
track
trade
train
tramp
trap
tray
treasure
treat
tree
trick
tricycle
tried
trim
trip
trolley
trouble
truck
true
truly
trunk
tunnel
turkey
turn
turtle
twelve
twenty
twice
trust
truth
try
tub
Tuesday
tug
tulip
tumble
tune
twig
twin
two
ugly
umbrella
uncle
under
understand
underwear
undress
unfair
unfinished

unfold
unfriendly
unhappy
unhurt
uniform
United States
unkind
unknown
unless
unpleasant
until
unwilling
up
upon
upper
upset
upside
upstairs
uptown
upward
us
use(d)
useful
valentine
valley
valuable
value
vase
vegetable
velvet
very
vessel
victory
view
village
vine
violet
visit
visitor
voice
vote
wag
wagon
waist
wait
wake(n)
walk
wall
walnut
want
war
warm
warn
was
wash(er)
washtub
wasn't
waste
watch
watchman
water
watermelon
waterproof
wave
wax
way
wayside
we
weak(ness)
weaken
wealth
weapon
wear
weary
weather
weave
web
we'd
wedding
Wednesday
wee
weed
week
we'll
weep
weigh
welcome
well
went
were
we're
west(ern)
wet
we've
whale
what
what's
wheat
wheel
when
whenever
where
which
while
whip
whipped
whirl
whisky
whisper
whistle
white
who
who'd
whole
who'll
whom
who's
whose
why
wicked
wide
wife
wiggle
wild
wildcat
will
willing
willow
win
wind(y)
windmill
window
wine
wing
wink
winner
winter
wipe
wire
wise
wish
wit
witch
with
without
woke
wolf
woman
women
won
wonder
wonderful
won't
wood(en)
woodpecker
woods
wool
woolen
word
wore
work(er)
workman

world
worm
worn
worry
worse
worst
worth
would
wouldn't
wound
wove
wrap
wrapped
wreck
wren
wring
write
writing
written
wrong
wrote
wrung
yard
yarn
year
yell
yellow
yes
yesterday
yet
yolk
yonder
you
you'd
you'll
young
youngster
your(s)
you're
yourself
yourselves
youth
you've

APPENDIX F

SAMPLE APPLICATION OF THE DALE LIST

Scepsis Scientifica, pp. 154-56

But we cannot know anything of nature but by an analysis of it to its true initial causes: and till we know the first springs of natural motions, we are still but ignorants. These are the alphabet of science, and nature cannot be read without them. Now who dares pretend to have seen the prime motive causes, or to have had a view of nature, while she lay in her simple originals? We know nothing but effects, and those but by our senses. Nor can we judge of their causes, but by proportion to palpable causalities, conceiving them like those within the sensible horizon. Now 'tis no doubt with the considerate, but that the rudiments of nature are very unlike the grosser appearances. Thus in things obvious, there's but little resemblance between the mucous sperm, and the completed animal. The egg is not like the oviparous production: nor the corrupted muck like the creature that creeps from it. There's but little similitude betwixt a terreous humidity, and plantal germinations; nor do vegetable derivations ordinarily resemble their simple feminalities. So then, since there's so much dissimilitude between cause and effect in the more palpable phenomena, we can expect no less between them, and their invisible efficients. Now had our senses never presented us with those obvious seminal principles of apparent generations, we should never have suspected that a plant or animal could have proceeded from such unlikely materials: much less, can we conceive or determine the uncompounded initials of natural productions, in the total silence of our senses. And though the Grand Secretary of Nature, the miraculous /Descartes have here infinitely out-done all the philosophers went before him, in giving a particular and analytical account of the universal fabric: yet he

intends his principles but for hypotheses, and never pretends that things are really or necessarily, as he has supposed them; but that they may be admitted pertinently to solve the phenomena, and are convenient supposals for the use of life. Nor can any further account be expected from humanity, but how things possibly may have been made consonantly to sensible nature: but infallibly to determine, how they truly were effected, is proper to him only that saw them in the chaos, and fashioned them out of that confused mass. For to say, the principles of nature must needs be such as our philosophy makes them, is to set bounds to ominpotence, and to confine infinite power and wisdom to our shallow models.

APPENDIX G

REVISED READABILITY TESTS WITH MODERNIZED PUNCTUATION

TABLE XXIX

COMPARISON OF COMPOSITE SCORES WITH MODERN PUNCTUATION: LANGUAGE ELEMENTS

Language Variable	Vanity	Scepsis	Essays
Words	2528.00	2361.00	1433.00
Sentences	97.00	62.00	52.00
Words per sentence	26.06	26.83	27.56

TABLE XXX

COMPARISON OF COMPOSITE SCORES WITH MODERN PUNCTUATION: READING GRADE LEVELS

Readability Formula	Vanity	Scepsis	Essays
Gunning Fog	15.59	16.14	15.35
Devereaux/ARI	13.19	13.76	13.58
Flesch-Kincaid	11.95	12.40	12.25
Flesch	9-10	9-10	9-10
Dale-Chall	11-12	11-12	9-10
Fry	10	10	10
Coleman	10.00	10.27	9.63
Holmquist	7.37	7.41	7.00
Powers	6.52	6.64	6.53

VITA

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